

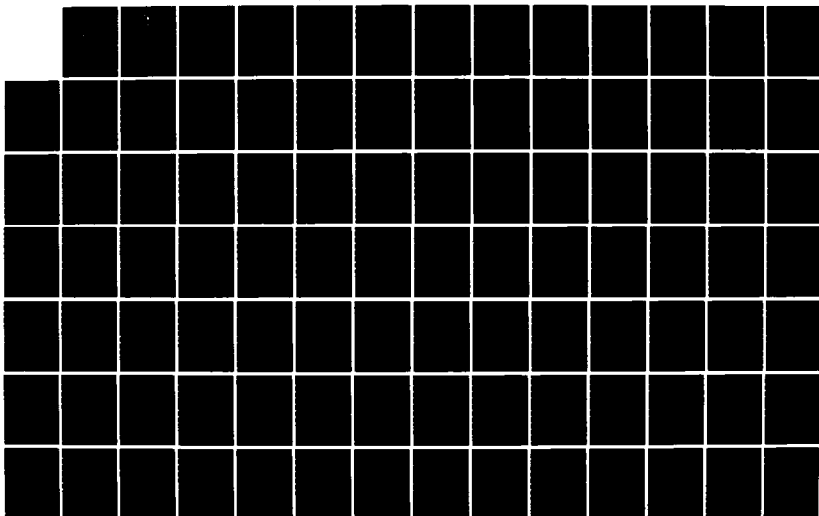
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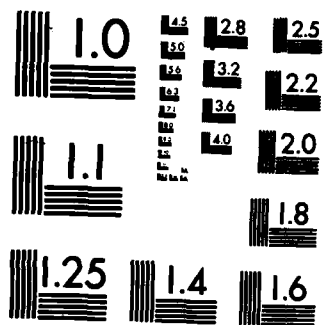
ANALYSIS AND GUIDELINES FOR THE PROCUREMENT OF
ELECTRONIC COMPONENTS IN G. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST. R W GAEKE
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IN GROUPS OF SIMILAR ITEMS

THESIS

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AFIT/GLM/LSM/84S-25

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ANALYSIS AND GUIDELINES FOR THE
PROCUREMENT OF ELECTRONIC COMPONENTS
IN GROUPS OF SIMILAR ITEMS

THESIS

Presented to the Faculty of the School of Systems and
Logistics of the Air Force Institute of Technology
Air University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science in Logistics Management

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September 1984

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Preface

The purpose of this thesis effort was to determine if it is feasible to manage and procure electronic components, in groups of similar items, at the Defense Electronics Supply Center (DESC) in Dayton, Ohio. The items selected for review were covered by five different military specifications and consisted of two types of resistors, two types of capacitors, and one type of circuit breakers. Historical data were reviewed for all items in each of the five groups, interviews were conducted with all manufacturers who had qualified products for the five groups of items, and interviews were conducted with managers from DESC's Directorates of Supply Operations and Contracting and Production. The conclusions reached were that it is feasible to manage and procure items in groups but only under certain conditions.

In performing the work connected with this thesis effort we have had a great deal of help from others. We are deeply indebted to our thesis advisor, Mr. Warren Barnes and to our two readers, Major Herbert Stewart and Mr. Charles Yother. We especially wish to thank Mr. Robert Radeloff for suggesting the thesis topic which proved both interesting and rewarding. A word of thanks is also owed to Kathy Faul and Elizabeth Townsend for their effort in

recording much of the accumulated information into the DESC word processing system. Finally, we wish to thank the members of our families, Marilyn Gaeke, Amanda Moore, and Stephanie Moore for the sacrifices they were required to make while we labored on this lengthy project.

Robert W. Gaeke

David E. Moore

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List of Acronyms

ADQ	Annual Demand Quantity
ADV	Annual Demand Value
DESC	Defense Electronics Supply Center
DLA	Defense Logistics Agency
DLSIE	Defense Logistics Studies Information Exchange
DSAC	Data Systems Automation Center
DTIC	Defense Technical Information Center
DVC	Demand Value Code
IQ	Indefinite Quantity
MPC	Minimum Procurement Cycle
NSN	National Stock Number
PGC	Procurement Group Code
PTDF	Procurement Technical Data File
QPL	Qualified Products List
SAMMS	Standard Automated Materiel Management System
SCF	Supply Control File
SSC	Supply Status Code

Abstract

The Defense Electronics Supply Center (DESC) purchases each one of the items it manages as the individual item breaches its reorder point. The objective of this thesis effort was to determine if it would be feasible for DESC to use a procurement group buying concept to purchase some of the items it manages. This concept would consist of buying items with similar characteristics as groups, rather than individually. Five groups of items were selected for review; these items were groups of similar items covered by military specifications MIL-C-39003, MIL-R-39007, MIL-R-39008, MIL-C-39014, and MIL-C-39019. The groups were reviewed and profiles of each group developed. The profiles, along with a letter and questionnaire, were furnished to the manufacturers that had qualified products for each of the military specifications. Interviews were then conducted with the manufacturers and with DESC managers in the Directorates of Supply Operations and Contracting and Production. The conclusions were that the procurement group buying concept was feasible but only under certain conditions. First, at least one of the manufacturers must be interested in the concept and willing to give quantity discounts on the group. Second, the annual dollar demand of the group must be sufficient to permit enough savings to

offset any additional administrative costs resulting from group buying. As a result of this thesis effort, several recommendations were made: (1) conduct a pilot study of the group buying concept using the MIL-C-39019 groups, (2) investigate the possibility of annual procurements for the MIL-R-39007 and MIL-C-39014 groups, (3) conduct further investigation on the MIL-R-39008 group with the idea of distributor involvement, and (4) review other military specifications for possible application of a group buying concept.

ANALYSIS AND GUIDELINES FOR THE
PROCUREMENT OF ELECTRONIC COMPONENTS
IN GROUPS OF SIMILAR ITEMS

I. Introduction

Overview

Procurement group buying consists of buying a group of items with similar characteristics with a single procurement instrument. The group of items are bought from the contractor who quotes the lowest price for the entire group rather than the lowest price on each individual item.

This thesis effort explored the advisability of implementing a group buying concept on selected groups of electronic components at the Defense Electronics Supply Center (DESC) in Dayton, Ohio. The thesis effort began with the selection of test groups of electronic components. Procedures were reviewed, interviews conducted and contractors questioned to determine what characteristics the groups should possess in order to facilitate the procurement group buying concept. Finally, an evaluation was made of whether or not the procurement group buying concept should be initiated at DESC for the specific test groups examined in this thesis.

Background

DESC is one of six supply centers that make up a part of the Defense Logistics Agency (DLA). The mission of DESC is:

To provide logistics management for assigned classes and items of electrical and electronics material. Logistics management includes the computation of requirements, inventory control, procurement, distribution, disposal, cataloging, supply, and mobilization planning. In conjunction with the Military Departments and industry, effect the maximum practical engineering standardization and appropriate application thereto of electronic parts as described in the Armed Forces Electro-Standards Agency Tri-Services Charter dated 1 February 1949 (3:II-1).

Within DESC the principle organizations that would be involved in the implementation of a procurement group buying concept are the Directorate of Supply Operations, Directorate of Technical Operations, Directorate of Contracting and Production, Directorate of Engineering Standardization, and the Office of Planning and Management.

The Directorate of Supply Operations, hereafter referred to as the supply directorate, provides stock control and inventory management of assigned items (3:IV-1-1). The Directorate of Contracting and Production, hereafter referred to as the procurement directorate, provides procurement and production support for all items (3:IV-2-1). The Directorate of Technical Operations provides cataloging, technical services, quality and reliability, provisioning, supply standardization, value engineering, and technical data (3:IV-3-1). The Directorate

of Engineering Standardization accomplishes standardization in support of engineering, procurement, supply management and parts control (3:IV-4-3). The Office of Planning and Management implements policy and objectives relating to short range and advanced plans, programs, and systems (3:III-3-1).

DESC has management responsibility for approximately 867,000 items for the Department of Defense (2:4). During fiscal year 1983 (FY 83), DESC awarded 160,861 contracts/purchase orders valued at \$593,683,125 (2:30). The principle tool used in the management of these items is the Standard Automated Materiel Management System (SAMMS) (4). The SAMMS is a computerized materiel management system developed by DLA and programmed at the DLA Data Systems Automation Center (DSAC) in Columbus, Ohio. The SAMMS reviews all items daily to determine if each item has reached its reorder point. If the reorder point is reached, a recommendation to buy the item is produced. The item manager in the supply directorate reviews the buy recommendation and approves, adjusts, or disapproves the buy. All approved or adjusted recommended buys are then entered into the SAMMS to generate purchase requests. These purchase requests are then forwarded to the procurement directorate for buy action. The buyers then solicit the approved sources and award a contract/purchase order to the lowest bidder for each individual item.

DESC manages and procures electronic components needed by the military services for spare parts. DESC, as manager, is charged with the responsibility of managing these parts in such a manner to provide timely and efficient logistical support to the military services. DESC utilizes a single line item inventory and procurement system where each line item is considered separately for procurement and inventory decisions. As each line item breaches its reorder point, the necessary actions are triggered to solicit bids from approved sources to acquire sufficient reorder quantities. Many of the line items DESC purchases are part of distinct families of similar electronic components and, as such, are very similar to other line items being procured and stocked. These similar line items are usually manufactured by the same vendors, on the same production lines, at the same plants. The question arises as to the feasibility of grouping these similar line items together for procurement and inventory decisions.

The procurement group buying concept has been considered as a possible alternative for some electronic components to the existing procurement system of buying only single line items. The objective of the procurement group concept is to manage and procure items that have very similar electrical and physical characteristics as a group. Since these groups of line items would be available from the same manufacturers that are supplying the single line item, a number of potential benefits are possible:

1. Dollar savings as a result of larger quantity discounts.
2. Increased competition.
3. Reduced number of purchase requests.

DESC has attempted to implement the procurement group buying concept on three different occasions dating back to 1975 (1). The first two studies were conducted on a selected group of circuit breakers and the third test was conducted on a group of semiconductors (1). In each case, the project was abandoned. In these previous attempts to implement the procurement group buying concept at DESC the major problem was the selection of a satisfactory group of similar electronic components to use in testing the system and procedures.

Extensive research failed to disclose any additional published studies. The research included requests for information from the Defense Logistics Studies Information Exchange (DLSIE), the Defense Technical Information Center (DTIC), and a review of existing technical journals and publications.

Problem Statement

Procurement of many electronic components by DESC has suffered from two major recurring problems: high unit prices and lack of competition. High unit prices can often be traced to the purchase of items in small quantities. One of the reasons for lack of competition is disinterest by

potential manufacturers in the low quantities being purchased. The procurement group buying concept is a potential tool to aid in reducing these problems on selected electronic components.

Research Objectives

The major focus of this thesis effort was to determine if the procurement group buying concept is feasible for selected electronic components that are managed, procured, and stocked by DESC. The research was directed towards determining if the procurement group buying concept would result in the following benefits on the selected group of electronic components:

1. Lower unit prices.
2. Increased competition.
3. Reduced number of purchase requests.

This effort concentrated on three specific areas. First, criteria were developed for the selection of electronic components suited for the procurement group buying concept. After the criteria were developed, test groups that met the criteria were selected for further analysis.

Second, methods were developed to compare the procurement group buying concept for the test groups to the existing procurement system. These methods were used to determine if the potential benefits of larger quantity

discounts, increased competition, and a reduced number of purchase requests are achievable.

Finally, the problems in implementing the procurement group buying concept were investigated. This effort involved reviewing existing procurement and inventory methods currently used at DESC and determining how to modify these methods to implement the procurement group buying concept.

Research Questions

Initially, the thesis effort focused on reviewing and choosing the test groups of electronic components. Since DESC manages a large number of separate line items, a means of streamlining the number of parts to be reviewed was a major concern. This effort in identifying potential candidates required answering a number of specific questions:

1. What part characteristics should be of concern in reviewing electronic components for family groupings?
2. What types of part documentation (e.g., engineering drawings, military specifications) are best suited for use in group procurement?
3. What is the number of manufacturers that can supply electronic components in the test group?
4. What is the annual demand, both quantity and dollar amount, for electronic components in the test group?

Initially, one of the major considerations in selecting the test group were the characteristics of the part. The selection of components to be included in the group required

that they be very similar in design, construction and function. For example, fixed resistors are a general functional area for a number of electronic components. The fixed resistor area contains various types of design and construction techniques (e.g., carbon composition, deposited film, wirewound), and within each particular design there are various electrical and physical characteristics (e.g., resistance value, power rating, physical dimensions).

Another important consideration was the type of documentation used to purchase the electronic parts. Electronic parts are purchased with a variety of procurement documents. This documentation can vary from very precise and detailed engineering drawings and military specifications to commercial part numbers. In selecting the target group, it was important that the documentation not preclude grouping the parts together. To illustrate this point, some engineering drawings limit the number of potential suppliers for the electronic components specified in the drawings. This limitation of sources for selected part types could preclude any effort to buy the items as a group.

The potential number of sources that could furnish parts under a group buying concept was another matter for consideration. Groups of electronic parts must be developed with the idea of encouraging participation of a number of manufacturers. A recurring problem with grouping parts is that manufacturers frequently can only supply portions of

the family. The procurement group buying concept is based on the requirement that a manufacturer bid on all or none of the items. This raises the possibility of reducing competition by excluding bids from manufacturers on portions of the group.

Since the procurement group concept as explored in this thesis was confined to DESC-managed items, the family groups had to be items that are bought on a regular and continuing basis by DESC. Electronic parts are managed by both DESC and the military services. In selecting the target group, the electronic parts chosen were those managed by DESC since inclusion of parts into the group that are managed by the services would only make evaluation of the procurement group buying concept more difficult.

Furthermore, parts selected for the test group were components that showed regular demand since development of procurement groups on items with little or no demand would not be productive. Unfortunately, in examining a family of items there was a range of demand for the different parts in the group which further complicated the situation.

After the test groups were selected, it was necessary to ascertain whether the perceived benefits of the procurement group buying concept would be realized. As stated previously, the expected benefits of the procurement group buying concept are dollar savings due to quantity discounts, enhanced competition, and a reduced number of

purchase requests. This effort will involve answering the following questions:

1. Will manufacturers be more willing to bid on group procurements versus single line item procurements?
2. Will manufacturers give quantity discounts for combining similar items in a group?
3. How many separate procurement actions will be initiated for the items in the group during a one year period under the existing procurement system?
4. How many separate procurement actions will be initiated for the group during a one year period under the procurement group concept?

In order to seriously consider the procurement group buying concept for each test group, the potential manufacturers must be willing to participate in group buys. Unless there is an indication of strong support from the potential manufacturers, the procurement group buying concept will not work.

Manufacturers were also contacted to determine the extent of quantity discounts available for combining similar items into a procurement group. The availability of quantity discounts for the test groups are essential if savings are to result from the procurement group buying concept.

Finally, information on the numbers of procurement actions initiated in FY 83 on each line item in the test groups was determined. This information was analyzed to determine the possibility of reducing the number of purchase requests by use of the group procurement buying concept.

After establishing the test groups and determining the methods to be used in evaluating each test group for group procurement feasibility, the means of implementing the procurement group buying concept was considered. Implementation of the procurement group buying concept depends to a large extent on making appropriate procedural adjustments, particularly in the supply directorate and the procurement directorate. Implementation of the procurement group buying concept requires investigation of the following questions:

1. How can identification of similar items in a procurement group be incorporated into the Standard Automated Materiel Management System (SAMMS)?
2. Can the SAMMS be programmed to review all items in the group for potential procurement when a single line item in the group breaches its reorder point?
3. Should items in the procurement group be segregated so that only a single item manager is responsible?
4. What type of procurement tool (e.g., contract, purchase order) is best suited for the procurement group buying concept?
5. How can the items in the procurement group be segregated so that only a single buyer is responsible for soliciting bids?

Use of the SAMMS for the procurement group buying concept is critical. The system must be analyzed to determine how to flag items in specific procurement groups. If the SAMMS can not be used, costly and tedious manual techniques would have to be employed.

In addition to flagging the procurement group items in the SAMMS, the ability to scan all items in the procurement group for potential procurement action whenever any single

item breaches its reorder point is important. Again, the alternative would be manual review.

To facilitate management of the procurement group items it would appear that a single inventory manager should be responsible for considering replenishment actions.

Implementing the procurement group buying concept also requires considering which of the procurement tools is best suited for the effort. To a large degree, dollar amounts involved will guide the selection.

Finally, to facilitate the procurement action, all items in the procurement group should be solicited at one time and a single buyer should be responsible for consolidating the group and soliciting bids.

II. Methodology

In order to answer the aforementioned research questions a means of collecting appropriate data had to be established.

The methods used for collecting data to answer the research questions fall into three major categories:

1. Collection of historical data from procurement and technical data bases at DESC.
2. Questionnaire sent to manufacturers of electronic components in the test group.
3. Personal interviews with managers at DESC in the supply and procurement directorates.

Furthermore, these three major areas of data collection occurred sequentially. First, after specific test groups were selected, historical data were collected on components in the respective test group. These historical data were analyzed to determine if the test group was a viable candidate. If the historical data indicated that the test group was a viable candidate then a questionnaire was sent to the manufacturers of the electronic components. Responses to the questionnaire were analyzed to determine if the test group remained feasible. Finally, for those test groups that were still viable candidates, interviews were conducted with managers in the supply and procurement directorates on the procedures necessary to implement procurement group buying for those test groups.

The next step in the research effort was to identify specific test groups for further investigation of the feasibility of the procurement group buying concept.

Selection of the Test Groups

Initially, the major focus of this effort was to identify groups of electronic components that would be potential candidates for the procurement group buying concept.

Because of the number of separate line items managed by DESC, it was not feasible to try to consider collecting historical data on this large a population. Furthermore, many of these line items are very unique and have very little or no potential for consideration for group procurement.

For the purposes of this research a means of identifying a smaller group of the population that could be tested for feasibility for the procurement group buying concept was needed.

A potential starting point was the existing set of military specifications on electronic components. Use of military specifications as the subgroup from which to pick potential test groups offered a number of advantages:

1. Military specifications on electronic components are frequently written to cover entire families of parts.
2. Part documentation is the same for all items in the test group.

3. Military specifications are written, in general, on components that have recurring demand.

4. Manufacturing sources that have products which have been tested and have met all the requirements of the military specification are listed on a Qualified Products List (38:4-2).

5. The government has configuration control over the items covered in a military specification.

Military specifications, particularly on the less complex electronic components, have already been written to cover groups of parts. The most notable examples would be the military specifications on relatively simple components like fixed resistors and fixed capacitors. For example, MIL-R-39007 covers power wirewound resistors and provides for hundreds of different specific resistor types that are very similar in design and construction (28). Therefore, use of existing military specifications would considerably simplify both the search for potential candidates and the resulting collection of data.

Use of military specifications as a starting point for potential test groups also simplified the consideration of documentation. Use of military specification items ensures that the performance, testing, and quality assurance requirements are consistent across the test group. Unfortunately, in considering other electronic components that are not covered on military specifications, it is frequently found that many of the items that appear feasible as a test group are bought to different contractor drawings which have different requirements. These different

requirements usually result in different processing or testing which tends to negate the benefits of the procurement group buying concept.

Another one of the goals in selecting potential test groups was to pick items that have recurring demand. Here again, the use of military specification items was advantageous. Military specifications are usually written to cover electronic components that have recurring demand. Thus, in picking potential test groups from the military specifications there was a much better chance of picking worthwhile candidates.

Identification of manufacturing sources for both individual items in the test group and manufacturing sources that could supply all items across the test group were additional problem areas. Many of the military specifications on electronic components have a qualification requirement (38:4-1). This qualification requirement stipulates that manufacturers must submit specific products for testing to ensure that the products meet all the requirements of the military specification. If the manufacturer is successful in testing his product, his company is listed on the Qualified Products List for that military specification. Once again, use of military specification electronic components simplified the search for manufacturing sources and the range of items in the test group that they can produce. Inspection of the appropriate

Qualified Products List made identification of manufacturing sources rather easy.

The use of military specifications on electronic components also ensured that adequate configuration control was exerted on items in the test group. When considering other electronic components for potential test groups, many of these items are bought to commercial part numbers that give the government very little control on potential modifications. Lack of configuration control presented a problem in trying to define test groups for the procurement group buying concept.

After narrowing the population from which test groups were to be selected to military specification items, the next step was to select specific test groups for further investigation. It was decided that specific test groups should meet the following criteria:

1. Manufacturers with qualified products listed on the Qualified Products List must be available.
2. There must be at least 100 different line items in the military specification chosen as the initial test group.
3. The product must be relatively stable, particularly from the standpoint of availability of qualified products.

As previously discussed, one of the major advantages in using military specifications with qualification requirements was the listing of manufacturers whose products meet the requirements of the military specification. However, just because a military specification has a qualification requirement does not always guarantee the

existence of qualified products. Thus, any military specification selected must have manufacturers with qualified products. In addition, the manufacturers must have qualified products for every item identified in the test group. This was a particularly significant requirement, since the test group was not to be constructed in such a manner as to eliminate some manufacturers when they were not able to bid on the entire test group because they were not qualified to all items in the test group.

As stated previously, in order to select a test group that had a sufficient number of line items, an arbitrary minimum limit of at least one hundred line items was set. It was necessary to set a limit since subsequent investigation and evaluation resulted in further reduction of the size of the test group.

An additional consideration was restricting the selection of the test group to stable electronic parts. The term stability was used in regard to changes in the availability of manufacturers with qualified products and changes in the requirements and testing of the electronic parts. These are areas that could affect the viability of the test group. For example, if there were frequent changes in the number or availability of manufacturers with qualified products, the procurement group would have to be consistently monitored for the impact of these changes and, if necessary, subsequently restructured.

After considering the aforementioned criteria and subsequent informal discussions with parts specialists in the Directorate of Engineering Standardization at DESC it was decided to initially develop test groups from military specifications in three specific product areas: fixed resistors, fixed capacitors, and circuit breakers.

Initially two military specifications in both the capacitor and resistor areas and one military specification in the circuit breaker area were chosen for subsequent investigation. It was the original intent of this research effort to consider additional military specifications both in these three areas and other component areas; but because of difficulties and delays in obtaining historical data the research effort had to be constrained to the five original military specifications in the resistor, capacitor, and circuit breaker areas.

In the fixed resistor area, the two military specifications selected for further investigation were MIL-R-39007, Resistors, Fixed, Wire-Wound, (Power Type), Established Reliability (28) and MIL-R-39008, Resistors, Fixed, Composition (Insulated), Established Reliability (43). MIL-R-39007 covers seven general resistor types with the number of line items in the National Stock System exceeding one thousand. The Qualified Products List for MIL-R-39007 lists six different manufacturing sources that have qualified products (10). MIL-R-39008 covers five general resistor types with the number of line items in the

National Stock System exceeding eight hundred. The Qualified Products List for MIL-R-39008 lists only one manufacturing source (11). MIL-R-39008 was chosen as a test group even though there is only one source because of anticipated high annual demand. Both of these military specifications represent mature and stable product areas.

In the fixed capacitor area the two military specifications selected for further investigation were MIL-C-39003, Capacitors, Fixed, Electrolytic, Tantalum, Solid-Electrolyted, Established Reliability (26) and MIL-C-39014, Capacitors, Fixed, Ceramic, Dielectric (General Purpose), Established Reliability (18). After conferring with parts specialists in the capacitor area, the test group under MIL-C-39003 was further constrained to only cover items covered by specification sheet MIL-C-39003/1. The number of line items in the National Stock System under MIL-C-39003/1 exceeded two hundred. The Qualified Products List for MIL-C-39003 lists five different manufacturing sources that have qualified products for MIL-C-39003/1 (6). In addition, the test group under MIL-C-39014 was further constrained to only cover capacitors in specification sheets MIL-C-39014/1 (39), /2 (35), and /5 (37). The number of line items in the National Stock System under MIL-C-39014/1, /2, and /5 exceeded one hundred and fifty. The Qualified Products List for MIL-C-39014 lists six different manufacturing sources that have qualified products for

MIL-C-39014/1 and /2 and five different manufacturing sources for MIL-C-39014/5 (7).

Finally, in the circuit breaker area a single military specification MIL-C-39019, Circuit Breakers, Magnetic, Low Power, Sealed, Trip-Free was selected for investigation (17). MIL-C-39019 covers six specification sheets, MIL-C-39019/1 (20), /2 (21), /3 (22), /4 (23), /5 (24), and /6 (25), with the number of line items in the National Stock System exceeding two hundred. The Qualified Products List for MIL-C-39019 lists two manufacturing sources that have qualified products for MIL-C-39019/1 and /2 and one manufacturing source for MIL-C-39019/3 through /6 (9).

After identifying the five specific test groups for further investigation of the procurement group concept, the next step in the research effort was the collecting of historical data on each respective test group.

Historical Data

Since there was no method currently available for identifying the items managed by DESC that are covered by the selected military specifications, a computer program was developed to identify these items. The program also selected historical data considered pertinent for evaluating the potential test groups as candidates for the procurement group buying concept. For example, the selected items had to be managed by DESC as stocked items rather than non-stocked items (i.e., buy on demand).

For purposes of this research effort, the following data elements were considered pertinent for evaluating the potential test groups as candidates for the group buying concept:

1. Military Part Number.
2. National Stock Number (NSN).
3. Supply Status Code (SSC).
4. Demand Value Code (DVC).
5. Standard Unit Price.
6. Annual Demand Quantity (ADQ).
7. Annual Demand Value (ADV).

The Military Part Number was collected in order to identify the specific items selected for each military specification. The military part number can be used for identifying the characteristics of the individual item. For example, MIL-R-39007 is the military specification covering fixed, wirewound, power, established reliability resistors. The military part numbers for this specification identify specific resistors including their resistance values, resistance tolerances, power rating and physical dimensions.

The National Stock Number (NSN) is a unique number assigned to each different item of supply (5:II-G2-44). The NSN is the primary reference number for most of the major data files at DESC and provides a means of counting the number of line items in each test group.

The Supply Status Code (SSC) is:

A code used to reflect, in material management records and in the Federal Cataloging System, decisions made by inventory managers as to the normal means-of-supply, stockage/nonstockage status of each assigned NSN (5:II-1-62-67).

The SSC indicates whether the NSN is a stocked or nonstocked item. For purposes of this research effort, only stocked items were considered for inclusion in the test groups and historical data were only selected for these stocked items. Nonstocked items are items that are bought in limited quantities for direct shipment to the using military activity and, as such, do not lend themselves to the concept of group procurement.

The Demand Value Code (DVC) is:

A code which categorizes Replenishment Demand Type Items on the basis of dollar value of forecasted demand (5:II-3-A85-1).

The DVC was selected for data collection because examining the DVCs for all items in the test group indicates the mix of high, medium, and low dollar items. High dollar items have an annual demand over \$4500 (5:II-3-A85-1). Medium dollar items have an annual demand greater than \$400 but less than or equal to \$4500 (5:II-3-A85-1). Low dollar items have an annual demand less than \$400 (5:II-3-A85-1). The DVCs for the test group were analyzed to determine if an appropriate mix exists for the procurement group. The mix is important because items in the high dollar classification usually have competitive unit prices but items in the medium dollar classification and particularly in the low dollar

classification have fairly substantial unit prices. For this reason, the premise was that the procurement group concept would be most advantageous for groups with a mix oriented toward medium and low dollar items since lumping these items together should result in much more competitive unit prices. The DVC was also used in estimating the number of buys made for items in the group under the current method of buying items individually as they breach their respective reorder points. The formula used was: high value items two buys a year, medium value items one buy every two years, and low value items one buy every three years.

The Standard Unit Price is the current catalog unit price of a NSN based upon the unit of issue (3:II-1-62-65). The Standard Unit Price was collected for every line item in the test group. The Standard Unit Price reflects the costs under the existing single line item procurement system. The Standard Unit Price was used in conjunction with the Annual Demand Quantity of each item to compute the Annual Demand Value for each item and for the procurement group.

The Annual Demand Quantity (ADQ) for each individual item represents the quantity of the item requisitioned during the previous twelve months. Therefore, the ADQ represents an estimate of the quantity that will be required for the succeeding twelve month period. The ADQ for the procurement group represents the sum of the ADQs for each item in the group. These data were furnished to the

manufacturers so that they could determine the potential volume for each procurement group and make recommendations concerning changes to the composition of the groups.

The Annual Demand Value (ADV) for each individual item represents the product of the ADQ for the item multiplied by the Standard Unit Price of the item. The ADV for the procurement group represents the sum of the ADVs for each item in the group. These data were not furnished to the manufacturers since it is computed using the Standard Unit Price of each item instead of the cost of each item. The Standard Unit Price contains the DESC surcharge rate (16.4% for FY 84) and therefore was not relevant for the manufacturer. These data were furnished to the DESC managers in supply and procurement since many of their item management and procurement decisions are based on the annual demand of items and the dollar value of buys.

The computer program developed to extract the previously discussed historical data on items in the test groups uses two DESC computer files: the Procurement Technical Data File (PTDF) and the Fractionation Detail Data File. The PTDF contains "data review criteria, procurement contract history data and procurement item description data which are necessary in the procurement of an item" (4:I-2-4-496). The PTDF was used to obtain the Military Part Number and NSN for the items covered by a given military specification. The Fractionation Detail Data File

provides "data for preparation of Fractionation Backup, Supply Management Grouping and High Frequency Item Listing" (4:I-2-10-586). The Fractionation Detail Data File was used to obtain the SSC, DVC, Standard Unit Price, ADQ, and ADV. For the purposes of this research effort, the program used to obtain the data was processed on 30 March 1984 and used the Procurement Technical Data File as of that date and the latest version of the Fractionation Detail Data, dated 31 December 1983. Therefore, the Military Part Numbers and National Stock Numbers selected were items managed as of 30 March 1984 and the Supply Status Code, Demand Value Code, and Standard Unit Price were as of 31 December 1983. The Annual Demand Quantity and Annual Demand Value were for calendar year 1983.

In order to validate the computer program used to identify the procurement groups and select the historical data, a random sample of thirty items was selected from the MIL-C-39019 group which contained 218 items. File printouts were obtained for each of the thirty items from the DESC Supply Control File (SCF). The SCF is the principal file in the Requirements Subsystem for the DESC Standard Automated Material Management System. The SCF is used for computing Management Levels and Forecasting Requirements. The Header Section of each record contains approximately 100 data elements for supply control and requirements forecasting. The SCF also contains demand and return histories for all

DESC managed items (4:I-2-2-605). For the sample of thirty items, all data elements selected from the Fractionation Detail Data File were compared to the file printouts from the SCF and there were no deviations. Based on this comparison, the program was considered acceptable and the resulting data were considered valid.

After extracting and analyzing the historical data to determine if the originally defined test groups were acceptable candidates, the next step in the research effort was to interview manufacturers of qualified products in the test groups.

Interviews with Manufacturers

In order to determine if there was industry support for the procurement group buying concept, a telephone interview was conducted with a representative of each manufacturer listed on the Qualified Products List for the appropriate test group. Without support from the manufacturers of the test groups the procurement group buying concept is unlikely to be successful.

To conduct telephone interviews with the manufacturers it was necessary to develop a standard questionnaire to be used in all the interviews (Figure 1). The questionnaire was a list of six questions requiring a yes or no response. In addition, the questionnaire could be used as an

1. Would your company be willing to participate in a group procurement on military specification items for which you are qualified?

Yes ()

No () Please provide details.

2. Would your company prefer bidding on groups versus the current practice of bidding on individual items?

Yes ()

No () Please provide details.

ANSWER QUESTIONS 3 THROUGH 6 ONLY IF THE RESPONSE TO QUESTION 1 WAS "YES"

3. If your company is willing to participate in the procurement group buying concept, would this result in prices based on the total quantity of the group rather than the quantity of each item (i.e., quantity discounts)?

Yes ()

No () Please provide details.

4. Would your company be willing to provide a price list which details the quantity discounts that would be available for the procurement group?

Yes ()

No () Please provide details.

5. If your company is able to save time, effort, and money on paperwork and documentation through the procurement group buying concept would you pass part of this savings on to the Government through lower prices or discounts?

Yes ()

No () Please provide details.

6. Would your company have any recommendations regarding the composition of the procurement group different from that originally identified (e.g., Would you prefer to provide only specific specification sheets, tolerances, etc.)?

Yes () Please provide details.

No ()

Figure 1. Telephone Interview Questions

exploratory instrument for obtaining additional information besides the simple yes or no response

The first question was used to determine the manufacturer's willingness to support the procurement group buying concept for those parts for which his company is qualified. This was the most significant question in the questionnaire since a negative response makes the remaining questions immaterial. Obviously, for the procurement group concept to be viable, it is preferable that all manufacturers respond in the affirmative. The rejection of the concept by a single manufacturer would seriously jeopardize the concept, since under these conditions implementation would restrict competition.

The second question was used to determine if the manufacturers would prefer the procurement group concept over the existing system. Thus, this question aided in determining if the procurement group concept would increase competition. The logic was that if manufacturers are more willing to bid on the larger quantities provided by the procurement group, the number of bids submitted for each solicitation should be higher than in the existing system, thus increasing competition.

The third question was used to determine if quantity discounts would become available by using procurement groups. The basic idea was that by grouping similar line items together the total quantity would be much higher than

if each line item was purchased separately. It was hoped that the larger quantities would allow the manufacturers to give quantity discounts to the government.

The fourth question ties in directly with the third question in that if quantity discounts are available, would the manufacturer supply a price list so that the extent of the savings could be estimated.

The fifth question was concerned with possible savings, regardless of quantity discounts, in time, effort, and paperwork by using the procurement group buying concept. The idea was that by grouping parts into a group, paperwork can be processed on a single group versus the current effort of completing paperwork on each and every line item.

The sixth question attempted to determine the specific composition of the test group. The test group profiles sent to the manufacturers initially were very general in nature and were not necessarily the best combination for the test groups. The question allowed the manufacturers to specify additional constraints on the composition of the test group. This restriction of the original test group could occur for a variety of reasons including manufacturing difficulties on specific parts (e.g., low yields) or anticipated deletion of specific products from the Qualified Products List. These data were reviewed and compared to the original test group in order to determine the actual group of electronic

components that were feasible for the procurement group buying concept.

The questions in this questionnaire were validated by having experts in the DESC Engineering Standardization Directorate and DESC legal staff review the questions for adequacy, completeness, and legality.

Prior to interviewing each company, a number of steps were taken. First, each manufacturer for the parts in the respective test group was contacted to obtain an appropriate contact for the subsequent telephone interview. Next, a cover letter explaining in more detail the procurement group buying concept was developed to be sent to each manufacturer. A test group profile was compiled using the historical data previously collected to be sent out with the cover letter. This test group profile provided the manufacturers with more information to determine the feasibility of the procurement group buying concept. This information included total number of items in the test group, total annual demand quantity, range of annual demand quantities, and number of buys and solicitations expected per year under the existing procurement system.

The cover letter, test group profile, and questionnaire were mailed from the Directorate of Engineering Standardization at DESC to each manufacturer. Each manufacturer was subsequently contacted to determine an appropriate date and time for the telephone interview. A

sample copy of the cover letter, questionnaire and test group profile are enclosed in Appendix A.

For each test group, data that were received from responses to the telephone interviews were tabulated and analyzed to determine if the procurement group buying concept had sufficient support from the manufacturing sources to be feasible. In order for the concept to be feasible, a high percentage, preferably all, of the manufacturers must be willing to bid on the electronic components. Thus, in reviewing the responses, the key requirement was a consensus among the manufacturers as to the feasibility of the concept, availability of lower prices, and the specific composition of the procurement group. If consensus was not reached on any particular test group regarding the feasibility of the concept, the reasons were documented.

After completing the telephone interviews and subsequent analysis of the responses, specific test groups that were still viable candidates were discussed in interviews with DESC managers in the supply and procurement directorates.

Interviews with DESC Managers

Interviews were conducted with managers in the supply and procurement directorates at DESC to determine the feasibility of implementing the procurement group buying

concept at DESC. The interviews were unstructured, allowing greater latitude for the respondents to answer. This flexible interview method was necessary in order to draw on the knowledge of these managers concerning the advantages/disadvantages of implementing the procurement group buying concept.

As a preliminary step, the results of the interviews with the manufacturers of qualified products in the test groups were presented to the DESC managers being interviewed in the supply and procurement directorates. This information included the specific composition of each test group based on the original historical data and subsequent modification of the groups based on input received from the manufacturers. This information was supplied in order to provide a better basis for evaluation of the concept by supply and procurement managers. In addition to the specific composition of the groups, the following information was also provided:

1. Number of items in each group.
2. Annual Demand Quantity of each group.
3. Annual Demand Value of each group.

Managers in the supply directorate were questioned on how items in the various groups could be managed, problems experienced in previous group procurement tests, and problems anticipated with the groups of items identified as part of this thesis effort.

Managers in the procurement directorate were questioned concerning the specific types of contracts that would be most suitable for the group buying concept, problems experienced in previous group procurement tests, and how these problems could be overcome in any future implementation of the group procurement concept.

The comments from the DESC managers were reviewed and analyzed along with the comments of the manufacturers, and the analysis is contained in the next chapter.

III. Analysis and Findings

The results of the analysis and findings are reported in this chapter and are based on the three primary sources of data: historical data, interviews with manufacturers, and interviews with DESC managers in the supply and procurement directorates.

The analysis section of this chapter consists of five subsections that contain the results of collecting and analyzing the three primary sources of data for each of the original test groups defined in Chapter II: MIL-R-39007; MIL-R-39008; MIL-C-39003/1; MIL-C-39014/1, /2, and /5; and MIL-C-39019. The findings section of this chapter consists of using the aforementioned data to answer the research questions posed in Chapter I.

Analysis

MIL-R-39007 Test Group. Military Specification MIL-R-39007 covers fixed, wire-wound, (power type), established reliability resistors, and was chosen as one of the test groups. This military specification has eight associated specification sheets (i.e., MIL-R-39007/5 (8), /6 (30), /7 (44), /8 (12), /9 (13), /10 (14), /11 (15), and /12 (16). Six manufacturing sources with qualified products to this specification are listed on the Qualified Products List. However, only three of the manufacturers have

qualified products for all eight specification sheets whereas two manufacturers have qualified products for seven of the specification sheets and the remaining manufacturer has qualified products for only six of the specification sheets.

The first step in analyzing the feasibility of this test group for the procurement group buying concept was to collect and subsequently analyze the historical data documented in Chapter II.

Historical Data. A summary of the historical data collected for MIL-R-39007 and its associated specification sheets is shown in Table I. The table presents data for each specification sheet and totals across the eight specification sheets. Referring to Table I, the total number of National Stock Numbers (NSNs) was 1533, the total Annual Demand Quantity (ADQ) was 171,985, and the number of expected buys per year under the existing procurement system was estimated to be 508. Since all of the manufacturing sources were not listed on the Qualified Products List for MIL-R-39007/5 and /12, they were deleted from the group. Further investigation revealed that MIL-R-39007/12 was inactive for new design and thus had very few items and low Annual Demand Quantity. MIL-R-39007/5 also had few items and low Annual Demand Quantity with only three items having an Annual Demand Quantity over 100. Based on this data, further investigation of the revised group was deemed worthwhile.

TABLE I
Preliminary MIL-R-39007 Test Groups Based
on Historical Data

MIL-R-39007/	5	6	7	8	9
Number of NSNs	33	232	118	311	304
ADQ	1267	23244	4646	35282	23606
Range of ADQ					
0-9	12	69	26	66	87
10-24	11	51	33	59	70
25-49	2	36	28	63	54
50-99	5	29	15	43	36
100-499	3	38	16	66	47
500-999	0	6	0	7	5
≥ 1000	0	3	0	7	5
Estimated Number of Buys/Year	11	76	38	106	98
Number of manufac- turers with qualified products	5	6	6	6	6

TABLE I (continued)

Preliminary MIL-R-39007 Test Groups Based
on Historical Data

MIL-R-39007/	10	11	12	Total
Number of NSNs	128	392	15	1533
ADQ	11013	72648	279	171985
Range of ADQ				
0-9	26	61	7	354
10-24	43	73	6	346
25-49	22	57	0	262
50-99	20	44	2	194
100-499	10	126	0	306
500-999	5	22	0	45
≥ 1000	2	9	0	26
Estimated Number of Buys/Year	43	131	5	508
Number of manufac- turers with qualified products	6	6	3	-

Interviews with Manufacturers. Telephone

interviews were conducted with the six manufacturers listed on the Qualified Products List for MIL-R-39007. Five of the six manufacturers indicated a willingness to participate in the group procurement concept. The manufacturer that was not willing to participate stated that most of their business with DESC is handled through their local distributor because they do not have the capability for military packaging or bar coding at their manufacturing plant. Of the five manufacturers that indicated a willingness to participate in the concept, all five indicated they would pass part of the potential savings in paperwork on to the Government. Four of the five manufacturers indicated a preference for the group buying concept over the current method and three of the four indicated a willingness to provide prices based on the total quantity of the group rather than the quantity of each item (i.e., quantity discounts). These same three manufacturers also agreed to provide price lists. All five manufacturers that were willing to participate in the concept made recommendations concerning the composition of the procurement group.

Based on the recommendations of the manufacturers, the original group was broken into two groups. One group consisted of MIL-R-39007/6 through /11 constrained to resistance tolerance F (i.e., ± 10 percent) and failure rate level R (i.e., 0.01 percent failures/1,000 hours). The

other group consisted of MIL-R-39007/6 through /11 constrained to resistance tolerance F and failure rate level S (i.e., 0.001 percent failures/1,000 hours). It was necessary to divide the groups based on failure rate levels because two of the manufacturers did not have qualified products for the failure rate level S parts. In addition, only items with an Annual Demand Quantity of 100 pieces were included in the two groups. The minimum Annual Demand Quantity of 100 was established as a compromise between the manufacturers that wanted all items included in the groups and those manufacturers that only wanted high volume items (e.g., Annual Demand Quantity of ≥ 500) included in the groups. Table II. contains a summary of the total number of National Stock Numbers (NSNs), the total Annual Demand Quantity (ADQ), the total Annual Demand Value (ADV), the estimated number of buys per year for the group under the existing procurement system, and the number of manufacturers with qualified products for each of the two revised groups.

TABLE II

Final MIL-R-39007 Procurement Groups Based on Historical Data and Manufacturer Interviews

Procurement Group	Number of NSNs	ADQ	ADV	Estimated Number of Buys/Year	Number of Mfgs. on GPL
1	253	98276	\$ 72701.84	92	6
2	78	36142	\$ 31501.88	29	4

Interviews with DESC Managers. The two revised procurement groups identified for MIL-R-39007 (see Appendix B) were provided to DESC managers in the supply and procurement directorates as the the basis for subsequent interviews. As discussed in Chapter II, the interviews were unstructured and relied on exploratory talks in regard to the feasibility of implementing the procurement group concept.

In discussing the procurement group buying concept with the contracting officer for resistors in the procurement directorate, several specific areas were covered. First, he felt that grouping purchase requests as they are generated by the supply system does not appear to be cost effective for these low unit price, high volume items. Conversely, making annual buys on the whole group of items does appear to present potential for savings over the current method of procurement. Second, the contracting officer felt that similar military specifications that have low unit prices and high volume such as MIL-R-39005(36), MIL-R-39017 (40), and MIL-R-55182 (19) would appear to offer the same potential for savings through annual buys. Finally, he recommended review of several military specifications that cover high unit price, low volume items (e.g., MIL-R-19 (45) and MIL-R-94 (29)) as possible candidates for the procurement group concept.

Concerning the procurement tool best suited for the procurement group concept, the contracting officer for

resistors recommended use of Indefinite Quantity (IQ) contracts. An Indefinite Quantity (IQ) contract is defined as follows:

An indefinite quantity contract provides for an indefinite quantity, within stated limits, of specific supplies or services to be furnished during a fixed period, with deliveries to be scheduled by placing orders with the contractor (49:16-12).

However, he identified two potential problems with using the IQ type of contract. First, competition is restricted for the life of the contract, normally one year. Second, if the company participating in the IQ contract has unforeseen problems meeting the contract requirements, a new contract may have to be written with a company that can provide the products when needed.

Copies of the two revised procurement groups for MIL-R-39007, in addition to the other revised groups contained in Appendix B, were next presented to a supervisory supply systems analyst in the supply directorate. This analyst had participated in the three previous unsuccessful attempts to implement a procurement group buying concept at DESC. After a cursory review of the revised groups for MIL-R-39007, he indicated that these groups seemed sufficiently large for a test of the procurement group buying concept. Other comments pertaining to the group buying concept in general are included in this subsection and will not be repeated for the other groups in their respective subsections.

The supply analyst indicated that if the group has a small number of items, the group should have mostly high demand items or mostly low demand items rather than a mix of each. If the group is large, the mix of items is not as important. He indicated that these groups could be entered into the Procurement Group Policy Table which is part of the DESC Standard Automated Materiel Management System (SAMMS). Concerning the assignment of all items in the group to a single item manager, he indicated that it could be done but he did not feel it was necessary. After further discussion, it was agreed that any test of the procurement group buying concept should include a test to determine the best method of item management for the items in the group.

MIL-R-39008 Test Group. Military Specification MIL-R-39008, which covers fixed, composition (insulated), established reliability resistors, was chosen as one of the test groups. This military specification has five associated specification sheets (i.e., MIL-R-39008/1 (46), /2 (42), /3 (34), /4 (47), and /5 (48)). Only one manufacturing source with qualified products to this specification is listed on the Qualified Products List.

The first step in analyzing the feasibility of this test group for the procurement group buying concept was to collect and subsequently analyze the historical data documented in Chapter II.

Historical Data. A summary of the historical data collected for MIL-R-39008 and its associated specification sheets is shown in Table III.

Interviews with Manufacturers. A telephone interview was conducted with the one manufacturer listed on the Qualified Products List for MIL-R-39008. The manufacturer's representative stated that they were not interested in the procurement group concept since DoD represents only a small portion of their business and because of the special packaging requirements of DoD purchases. Furthermore, they prefer that all DoD purchases be handled through their authorized distributors. Since this company did not indicate a willingness to participate in the procurement group concept (i.e., Question 1) they were not interviewed concerning the remaining five questions.

Interviews with DESC Managers. The only manufacturer on the Qualified Products List for MIL-R-39008 was not interested in the procurement group buying concept. Therefore, the only alternative would be to use the concept for buying these items through the authorized distributors. The contracting officer in the DESC procurement directorate indicated that these items are currently bought mainly through distributors. The contracting officer stated that grouping of purchase requests as individual items breach their reorder points would not result in significant cost savings because of the low unit prices of these items and

TABLE III

Preliminary MIL-R-39008 Test Groups Based
on Historical Data

MIL-R-39008/	1	2	3
Number of NSNs	165	171	168
ADQ	2582935	1315611	366873
Range of ADQ			
0-9	0	0	1
10-24	0	0	1
25-49	0	1	1
50-99	0	0	1
100-499	0	4	35
500-999	2	7	33
≥ 1000	163	159	96
Estimated Number of Buys/Year	68	69	61
Number of manufac- turers with qualified products	1	1	1

TABLE III (continued)
Preliminary MIL-R-39008 Test Groups Based
on Historical Data

MIL-R-39008/	4	5	Total
Number of NSNs	162	146	812
ADQ	466122	357520	5091061
Range of ADQ			
0-9	0	1	2
10-24	1	0	2
25-49	0	1	3
50-99	0	4	5
100-499	16	34	89
500-999	26	21	89
≥ 1000	119	85	622
Estimated Number of Buys/Year	59	58	325
Number of manufac- turers with qualified products	1	1	-

the limited volume of parts. The contracting officer felt that only by estimating annual requirements and initiating an annual buy would quantities be large enough to result in a cost savings due to lower unit prices on already low price items.

MIL-C-39003 Test Group. As discussed in Chapter II, Military Specification MIL-C-39003/1 which covers fixed, electrolytic, tantalum, solid-electrolyted capacitors was chosen as one of the test groups. The Qualified Products List for MIL-C-39003 lists five different manufacturing sources that have qualified products for MIL-C-39003/1.

The first step in determining the feasibility of this test group for the procurement group buying concept was to collect and subsequently analyze the historical data.

Historical Data. A summary of the historical data collected for MIL-C-39003/1 is shown in Table IV. Referring to Table IV., the total number of National Stock Numbers (NSNs) was 225, the total Annual Demand Quantity (ADQ) was 326,548, and the number of expected buys per year under the existing procurement system was estimated to be 148. Based on this data, further investigation of the group was deemed worthwhile.

TABLE IV

Preliminary MIL-C-39003/1 Test Group Based
on Historical Data

Number of NSNs	225
ADQ	326548
Range of ADQ	
0-9	22
10-24	25
25-49	20
50-99	21
100-499	57
500-999	22
≥ 1000	58
Estimated Number of Buys/Year	148
Number of manufac- turers with qualified products	5

Interviews with Manufacturers. Prior to conducting the telephone interviews, each company was contacted to obtain a point of contact for the subsequent interview. In the process of establishing these initial contacts, information was received that one of the manufacturers currently listed on the Qualified Products

List (QPL) for MIL-C-39003/1 would be dropping off the QPL and, as a result, was not interested in the interview.

Out of the four manufacturers interviewed, all four indicated a willingness to participate in group procurement on MIL-C-39003/1. However, only three out of the four manufacturers indicated a preference for the procurement group concept versus the current practice of bidding on individual items. The manufacturer that did not prefer the procurement group concept cited a number of reasons:

1. The company does not stock parts but manufactures parts to order; thus, even if a group order is submitted, the order will be broken down for each line item.
2. A company may not wish to bid on all items in the group because some parts are relatively easy to manufacture while others take more time and effort.
3. The annual demand quantities for the DESC estimated procurements does not represent substantial volumes.

In regard to the availability of quantity discounts, only one of the manufacturers indicated that quantity discounts would be available based on the total quantity of the group. The remaining manufacturers stated that prices were already low and grouping parts together would not result in any further reductions. Furthermore, the lone manufacturer that stated that quantity discounts might be available indicated that only high volume parts should be included in the test group.

As for a price list, none of the manufacturers indicated a preference for supplying a price list prior to procurement. All four companies did indicate that if

savings did materialize from reductions in time and effort in paperwork and documentation, the benefits would be passed on to the Government. However, they were less sure that the group procurement concept would actually result in savings in time and effort in processing paperwork and documentation.

Concerning the composition of the test group, none of the manufacturers preferred a single test group covering all MIL-C-39003/1 items. Comments received from the manufacturers were fairly consistent regarding potential division and these recommendations are summarized as follows:

1. Segregate the parts by case size (Note: There are five different case sizes in MIL-C-39003/1).
2. Group parts in the following voltage rating(s):
 - a. 6 to 35 volts.
 - b. 50 volts.
 - c. 75 volts.
 - d. 100 volts.
3. Restrict the parts to a ± 10 percent capacitance tolerance.
4. Restrict the parts to failure rate levels R and S.

Based on the results of the interviews with the manufacturers a number of changes were made. Dividing up the original group based on voltage ratings and case sizes resulted in thirteen new procurement groups. Within each of these groups, parts were further constrained to be ± 10 percent capacitance tolerance and S failure rate level. The specific composition of each test group including Annual Demand Quantity (ADQ), Annual Demand Value (ADV), and

National Stock Number (NSN) were compiled for each part number in the group and for the entire group as illustrated in Appendix B. The ADQ, ADV, number of NSNs, and estimated number of annual procurement actions (i.e., buys) under the existing procurement system are summarized in Table V.

Interviews with DESC Managers. Out of the thirteen procurement groups developed under MIL-C-39003/1 only the first four procurement groups were provided to the DESC managers in the supply and procurement directorates for review (see Appendix B, MIL-C-39003/1, Procurement Groups 1 through 4). This reduced list was provided in order that the managers would not have to review thirteen different groups on this one military specification. In addition, two of the first four groups did contain the largest groupings of parts.

In discussing the procurement group buying concept with the contracting officer for capacitors in the procurement directorate a number of specific areas were covered. First, after reviewing the four procurement groups, the contracting officer indicated that none of the groups were large enough in terms of number of NSNs, Annual Demand Quantity, or Annual Demand Value to justify the time and effort required in the procurement and supply directorates to implement a pilot study. Furthermore, it was suggested that MIL-C-39006 (27), particularly MIL-C-39006/22 (32), or military specifications on variable capacitors would lend themselves

TABLE V

Final MIL-C-39003/1 Procurement Groups Based on Historical
Data and Manufacturer Interviews

Procurement Group	Number of NSNs	ADQ	ADV	Estimated Number of Buys/Year	Number of Mfgs. on QPL
1	9	33231	\$ 14896.26	4	4
2	27	54806	\$ 31647.49	14	4
3	10	2338	\$ 2970.00	4	4
4	25	4706	\$ 12783.31	10	4
5	13	89940	\$ 63452.23	14	4
6	8	25439	\$ 20115.71	6	4
7	6	1883	\$ 4598.66	3	4
8	7	3218	\$ 6092.63	3	4
9	10	45062	\$ 48122.67	10	4
10	7	12440	\$ 30564.98	8	4
11	5	7151	\$ 46177.19	6	4
12	12	32404	\$113741.09	14	4
13	2	1022	\$ 4199.72	1	4

more readily in terms of potential cost savings for the procurement group buying concept.

In discussing the MIL-C-39003/1 test groups with a supervisory supply analyst in the supply directorate, it was indicated that the groups seemed too small in terms of numbers of NSNs for a possible pilot study.

MIL-C-39014 Test Group. Military Specification MIL-C-39014, which covers ceramic dielectric capacitors was chosen as one of the test groups. More specifically, MIL-C-39014/1, /2, and /5 were chosen for detailed consideration. The Qualified Products List for MIL-C-39014 lists six different manufacturing sources that have qualified products for MIL-C-39014/1 and /2 and five different manufacturing sources for MIL-C-39014/5.

The first step in determining the feasibility of this test group for the procurement group buying concept was to collect and subsequently analyze the historical data.

Historical Data. A summary of the historical data collected for MIL-C-39014/1, /2, and /5 are shown in Table VI. The table presents data for each specification sheet and totals across the three specification sheets. However, in reviewing the specific parts in the test group against the Qualified Products List for MIL-C-39014/1 and /2 it was found that only five of the six manufacturers had qualified products for parts in the test group. Similarly, only four of the five manufacturers listed for MIL-C-39014/5 had qualified products for parts in the test group. Referring

TABLE VI

Preliminary MIL-C-39014 Test Groups Based
on Historical Data

MIL-C-39014/	1	2	5	Total
Number of NSNs	50	36	81	167
ADQ	312000	314634	72595	699249
Range of ADQ				
0-9	0	0	8	8
10-24	1	1	6	8
25-49	0	0	5	5
50-99	0	0	10	10
100-499	0	2	29	31
500-999	3	7	7	17
≥ 1000	46	26	16	88
Estimated Number of Buys/Year	31	23	31	85
Number of manufac- turers with qualified products	5	5	4	-

to Table VI, the total number of National Stock Numbers (NSNs) were 167, the total Annual Demand Quantity (ADQ) was 699,249, and number of expected buys per year under the existing procurement system was estimated to be 85. Based on this data, further investigation of the group was deemed worthwhile.

Interviews with Manufacturers. Prior to conducting telephone interviews, each company was contacted to obtain a point of contact for the subsequent interview. In the process of establishing these initial contacts, information was received that two of the manufacturers currently listed on the Qualified Products List (QPL) for MIL-C-39014/1 and /2 would be dropping off the QPL and as a result were not interested in the interview.

Telephone interviews were conducted with the four manufacturers that had qualified products for the MIL-C-39014/1, /2, and /5 parts in the test group.

Out of the four manufacturers interviewed, all four indicated a willingness to participate in group procurement on MIL-C-39014 items. However, only three out of the four manufacturers indicated a preference for the procurement group concept versus the current practice of bidding on individual items. The manufacturer that did not prefer the procurement group concept cited a number of reasons (Note: The same manufacturer is also qualified to MIL-C-39003/1):

1. The company does not stock parts but manufactures parts to order; thus, even if a group order is submitted, the order will be broken down for each line item.

2. A company may not wish to bid on all items in the group because some parts are relatively easy to manufacture while others take more time and effort.

3. The annual demand quantities for the DESC estimated procurement does not represent substantial volumes.

In regard to the availability of quantity discounts, three of the four manufacturers indicated that quantity discounts would be available based on the total quantity of the group. However, all three companies that responded affirmatively to the availability of quantity discounts indicated that the procurement group should be restricted to high volume parts (normally ≥ 500 pieces).

As far as a price list, none of the manufacturers indicated a preference to supply price lists prior to any actual procurement but instead preferred to quote on specific solicitations.

Only one of the four companies indicated that there might be a potential for savings in time, effort, and money on paperwork and documentation by using the procurement group concept. All four companies did indicate that if savings did materialize the benefits would be passed on to the Government.

Concerning the composition of the test group, none of the manufacturers preferred combining MIL-C-39014/1, /2, and /5 into one group. Comments received from the manufacturers were fairly consistent regarding the division of the group and these recommendations are summarized as follows:

1. Segregate the parts by specification sheet.
2. Restrict the parts in the group to failure rate level R and S (Note: Two companies preferred combining R and S while one company preferred only S).
3. Restrict the parts to a $\pm 10\%$ capacitance tolerance.
4. Delete MIL-C-39014/5 from consideration because of the five different case sizes in the specification sheet.

Based on the results of the interviews with the manufacturers, a number of changes were made. First, two new test groups covering MIL-C-39014/1 and /2 were created. MIL-C-39014/5 parts were deleted from consideration. Within each test group on a single specification sheet, parts were further constrained to ± 10 percent capacitance tolerance and failure rate level S. The specific composition of each test group including Annual Demand Quantity (ADQ), Annual Demand Value (ADV), and National Stock Number (NSN) were compiled for each part number in the group and for the entire group as illustrated in Appendix B. The ADQ, ADV, number of NSNs, and estimated number of annual procurements (i.e., buys) under the existing procurement system are summarized in Table VII.

TABLE VII

Final MIL-C-39014 Procurement Groups Based on Historical
Data and Manufacturer Interviews

Procurement Group	Number of NSNs	ADQ	ADV	Estimated Number of Buys/Year	Number of Mfgs. on QPL
1	49	410241	\$ 96786.26	31	4
2	35	315101	\$120510.41	23	4

Interviews with DESC Managers. The two specific test groups identified for MIL-C-39014/1 and /2 were provided to DESC managers in the supply and procurement directorates as the basis for subsequent interviews. Only comments relating specifically to these groups are discussed.

In discussing the procurement group buying concept with the contracting officer for capacitors in the procurement directorate, a number of specific areas were covered. First, after reviewing the two specific test groups in MIL-C-39014, the contracting officer indicated that both groups were too small in terms of number of items and corresponding Annual Demand Values. The parts in these groups have fairly low unit prices already, and the savings resulting from a group procurement effort would probably be too low to justify the time and effort necessary in the procurement and supply directorates. Furthermore, it was suggested that MIL-C-39006, particularly MIL-C-39006/22, or

military specifications on variable type capacitors, which have much higher unit prices, should be investigated for application of the procurement group buying concept. If a pilot study would be conducted on these MIL-C-39014 groups, it was suggested that an Indefinite Quantity (IQ) contract be used and buys be conducted on an annual basis to maximize savings.

In discussing the MIL-C-39014 test groups with a supervisory supply systems analyst in the supply directorate, no specific comments regarding the composition of the test groups were received. However, it was stated that the groups had sufficient numbers of NSNs and Annual Demand Values for a possible pilot study.

MIL-C-39019 Test Group. As discussed in Chapter II, Military Specification MIL-C-39019 which covers low power, magnetic circuit breakers was chosen as one of the test groups. This military specification has six associated specification sheets (i.e., MIL-C-39019/1 through /6). Two manufacturing sources with qualified products to this specification are listed on the Qualified Products List. However, only one of the manufacturers has qualified products for all the specification sheets whereas the other manufacturer only has qualified products for MIL-C-39019/1 and /2.

The first step in determining the feasibility of this test group for the procurement group buying concept was to collect and subsequently analyze the historical data discussed in Chapter II.

Historical Data. A summary of the historical data collected for MIL-C-39019 and its associated specification sheets is shown in Table VIII. Although the table presents data for the entire specification and each specification sheet, it was necessary to divide the group based on the number of manufacturers with qualified products. Currently, two manufacturers have qualified products for MIL-C-39019/1 and /2 while only one manufacturer has qualified products for MIL-C-39019/3 through /6. As a result, two procurement groups consisting of MIL-C-39019/1 and /2 as the first group and MIL-C-39019/3 through /6 as the second group were formed. Referring to Table VIII, the original test group covering all MIL-C-39019 parts that are DESC stocked and managed was found to contain 216 National Stock Numbers (NSNs). As previously stated, subsequent analysis of the historical data in conjunction with the QPL required division of the original test group into two new groups as shown in Table IX. Based on the number of NSNs and Annual Demand Quantities (ADQs) for the two new test groups further investigation of the groups was deemed worthwhile.

Interviews with Manufacturers. Telephone interviews were conducted with the two manufacturers listed on the Qualified Products List for MIL-C-39019. Both manufacturers indicated a willingness to participate in the group procurement concept, a preference for this concept, a willingness to provide quantity discounts, and pass on part of the potential savings in paperwork on to the Government.

TABLE VIII

Preliminary MIL-C-39019 Test Groups Based
on Historical Data

MIL-C-39019/	1	2	3	4
Number of NSNs	56	40	32	22
ADQ	9219	3058	1741	362
Range of ADQ				
0-9	17	20	13	10
10-24	7	6	4	6
25-49	7	4	2	6
50-99	7	4	4	0
100-499	10	5	9	0
500-999	6	0	0	0
≥ 1000	2	1	0	0
Estimated Number of Buys/Year	43	21	21	8
Number of manufac- turers with qualified products	2	2	1	1

TABLE VIII (continued)

Preliminary MIL-C-39019 Test Groups Based on
Historical Data

MIL-C-39019/	5	6	Total
Number of NSNs	37	29	216
ADQ	3180	850	18410
Range of ADQ			
0-9	11	12	83
10-24	6	4	33
25-49	4	6	29
50-99	4	7	26
100-499	11	0	35
500-999	1	0	7
≥ 1000	0	0	3
Estimated Number of Buys/Year	32	17	142
Number of manufac- turers with qualified products	1	1	-

TABLE IX

Intermediate MIL-C-39019 Test Groups Based on
Historical Data and QPL

MIL-C-39019/	1 and 2	3 through 6
Number of NSNs	96	120
ADQ	12277	6230
Range of ADQ		
0-9	37	46
10-24	13	20
25-49	11	18
50-99	11	15
100-499	15	20
500-999	6	1
≥ 1000	3	0
Estimated Number of Buys/Year	64	78
Number of manufac- turers with qualified products	2	1

In regard to the availability of quantity discounts, both manufacturers indicated that there would be no restrictions in terms of a minimum number of parts for a given line item.

On the subject of price lists, one manufacturer indicated a willingness to supply a price list while the other manufacturer indicated a preference to quote only on specific solicitations.

In regard to the composition of the test group, one manufacturer preferred a single procurement group covering the entire specification while the other manufacturer preferred a division of the group into two procurement groups. This division resulted in one group consisting of MIL-C-39019/1 and /2 with a second group consisting of MIL-C-39019/3 through /6. This further restriction of the original test group by the one manufacturer matches similar conclusions already reached after reviewing the historical data in conjunction with the Qualified Products List. The above information further substantiated the composition of the two procurement groups as identified in Table IX.

Based on the interviews with the manufacturers and analysis of the historical data, the specific composition of each test group including Annual Demand Quantity (ADQ), Annual Demand Value (ADV), and National Stock Number (NSN) number in the group and for the entire group is illustrated in Appendix B. The Annual Demand Quantity (ADQ), Annual Demand Value (ADV), estimated number of annual procurement actions (i.e., buys) under the existing system,

and number of National Stock Numbers (NSNs) are listed in Table X (Note: ADQ and number of NSNs vary slightly from Table IX because the original historical data contained information on superseded part numbers which were deleted from the groups).

TABLE X

Final MIL-C-39019 Procurement Groups Based on Historical Data and Manufacturer Interviews

Procurement Group	Number of NSNs	ADQ	ADV	Estimated Number of Buys/Year	Number of Mfgs. on QPL
1	94	12244	\$330763.18	64	2
2	119	6173	\$366156.39	78	1

Interviews with DESC Managers. The two specific test groups identified for MIL-C-39019 (see Appendix B) were provided to DESC managers in the supply and procurement directorates as the basis for subsequent interviews.

In discussing the procurement group buying concept with the contracting officer for circuit breakers in the procurement directorate, a number of specific areas were covered. First, in discussing the feasibility of the concept for MIL-C-39019 items, it was discovered that a limited effort on group procurement for MIL-C-39019 items

had already been occurring for a period of about two months. Second, cost savings of approximately \$15,000 had been documented for this two month period and submitted on an Expanded Focus Program Form (DESC Form 727-Oct 83) to the DESC Competition Advocate Office. Thus, not only were the MIL-C-39019 test groups as already identified considered viable by the contracting officer, but he also recommended other military specifications on circuit breakers be analyzed for application of the concept, particularly MIL-C-5809 (41) and MIL-C-55629 (31). Third, for these types of items, several procurement tools were recommended. For sole source items (i.e., MIL-C-39019/3 through /6 procurement group) a Basic Ordering Agreement (BOA) could be used. A Basic Ordering Agreement (BOA) is defined as follows:

A basic ordering agreement is a written instrument of understanding, negotiated between an agency, contracting activity, or contracting officer and a contractor, that contains (1) terms and clauses applying to future contracts (orders) between the parties during its term, (2) a description, as specific as practicable, of supplies or services to be provided, and (3) methods for pricing, issuing, and delivering future orders under the basic ordering agreement. A basic ordering agreement is not a contract (49:16-15).

For groups that have multiple sources, purchase orders should be used for buys under \$25,000 and an Invitation For Bid (IFB) should be used for buys exceeding \$25,000. A purchase order is defined as follows:

A purchase order... means an offer by the Government to buy certain supplies or nonpersonal services and construction from commercial sources upon specified terms and conditions, the aggregate amount of which does not exceed the small purchase limit (49:13-1).

The small purchase limit is greater than \$25,000 for defense agencies (49:13-1). Fourth, purchase requests received from the supply directorate should be consolidated in order that quantities reach a threshold quantity of at least 250 pieces with quantities of 500 and 1000 being the next thresholds to consider. Finally, other comments related to the procurement group buying concept in general and will be discussed later in this chapter.

In discussing the MIL-C-39019 test groups with a supervisory supply systems analyst in the supply directorate, no specific comments regarding the composition of the test group were received. However, it was stated that the groups had sufficient numbers of NSNs and Annual Demand Values for a possible pilot study.

Findings

The first set of research questions pertain to identification of potential test groups and are as follows:

1. What part characteristics should be of concern in reviewing electronic components for family grouping?
2. What types of part documentation are best suited for use in group procurement?
3. What is the number of manufacturers that can supply electronic components in the test group?
4. What is the annual demand, both quantity and dollar amount, for electronic components in the test group?

In considering part characteristics of interest in selecting potential test groups, a number of criteria were

used. First, the test group had to be composed of parts that were very similar in design, construction, and performance. For example, the function of the part could be a resistor. In addition, the resistor would have to be of similar design and construction, for instance, a power wirewound, axial leaded resistor. Second, parts in the test group had to be manufactured on the same or similar production lines by a manufacturer. This requirement was needed to ensure that the test group did, in fact, cover a manufacturer's production of similar parts. Thus, in selecting test groups it was found that the following part characteristics were of importance:

1. Function of the part.
2. Design of the part.
3. Construction of the part.
4. Parts must be manufactured on a single or similar production line by a manufacturer.

In considering the part documentation that was to be used, a number of criteria were used. First, test groups should be chosen where the documentation for parts in the test group are consistent and uniform. As discussed in Chapter II, similar items are frequently bought to different contractor drawings. These contractor drawings may require varying amounts of inspection and testing which would tend to hinder the procurement group concept. Furthermore, a single document with consistent and uniform requirements would be more preferable. Testing, inspection, and quality assurance requirements should be the same across the test

group. Finally, the documentation used should not restrict competition. As stated in Chapter II, for these reasons plus the availability of qualified products, military specifications were chosen as the preferred documentation. Thus, criteria for documentation to be used in selecting test groups are summarized as follows:

1. Military specifications with qualification requirements.
2. Consistent and uniform testing, inspection, and quality assurance requirements.

The numbers of manufacturers that can supply electronic components for the identified procurement groups varies by group and are listed in Tables II, III, VI, VII, and X. The two groups developed for MIL-R-39007 had six and four manufacturing sources respectively. MIL-R-39008 had one source for the original group. MIL-C-39003/1 was broken into thirteen groups which all had four sources. MIL-C-39014 was divided into two groups that both had four sources. Two groups were formed in MIL-C-39019, one group had two sources and the other group had only one source. Out of the final nineteen procurement groups, seventeen of the groups were competitive in nature because of the availability of two or more manufacturers with qualified products.

The annual demands, both quantity and dollar amount for each of the procurement groups except MIL-R-39008, are listed in Tables II, V, VII, and X under Annual Demand Quantity (ADQ) and Annual Demand Value (ADV), respectively.

Since the only manufacturer of the MIL-R-39008 group was not interested in the procurement group concept, the Annual Demand Value for this group was not computed. The ADG for the final groups ranged from a low of 1022 for one of the groups in MIL-C-39003/1 to a high of 410,241 for one of the groups in MIL-C-39014 (Note: MIL-R-39008 was not included as one of the final groups). The ADV for the groups ranged from a low of \$2970.00 for one of the groups in MIL-C-39003/1 to a high of \$366,156.39 for one of the groups in MIL-C-39019.

The second set of research questions pertain to developing methods to determine the benefits of the procurement group buying concept and are as follows:

1. Will manufacturers be more willing to bid on group procurements versus single line item procurements?
2. Will manufacturers give quantity discounts for combining similar items in a group?
3. How many separate procurement actions will be initiated for the items in the group during a one year period under the existing procurement system?
4. How many separate procurement actions will be initiated for the group during a one year period under the procurement group concept?

Manufacturers for the procurement groups indicated a willingness to bid on group procurements versus single line item procurement as follows:

1. MIL-R-39007: four of six manufacturers were willing to bid on the groups.
2. MIL-R-39008: the only manufacturer for this group was not interested in the procurement group concept.
3. MIL-C-39003/1: three of four manufacturers were willing to bid on the group

4. MIL-C-39014: three of four manufacturers were willing to bid on the groups.

5. MIL-C-39019: the two manufacturers for this group were both willing to bid on the groups.

The manufacturers indicated a willingness to give discounts based on the total quantity of the group rather than the quantity of each item as follows:

1. MIL-R-39007: three out of six manufacturers.
2. MIL-R-39008: the only manufacturer for this group was not interested in the procurement group concept.
3. MIL-C-39003/1: one of the four manufacturers.
4. MIL-C-39014: three of the four manufacturers.
5. MIL-C-39019: both manufacturers.

The estimated number of separate procurements initiated for items in the identified procurement groups for a one year period under the existing procurement system is listed in Tables II, III, V, VII, and X. The expected number of separate procurement actions for the final groups ranged from a low of one for one of the groups in MIL-C-39003/1 to a high of 92 for one of the groups in MIL-R-39007 (Note: MIL-R-39008 was not included as one of the final groups).

The estimated number of separate procurement actions initiated for items in the identified procurement groups for a one-year period under the procurement group concept would vary based on the selected method of procurement. If an annual buy was made for the group, there would theoretically be only one buy per year for the group. If items in the group were reviewed whenever one item in the group breaches

its reorder point, the number of buys for the group would be determined by the Minimum Procurement Cycle (MPC) selected for the group. The MPC is a time period (in months) assigned to each procurement group so that whenever one item within the group breaches its reorder point, all other items within the group will be mechanically reviewed to determine which items will breach their reorder points within the assigned MPC time period for the group. For example, if a MPC of one month was assigned to the group, the theoretical number of buys for that group would be one per month or twelve per year. If a MPC of six months was assigned to the group, the theoretical number of buys for that group would be one every six months or two per year.

The third set of research questions pertain to the implementation of the procurement group buying concept at DESC and are as follows:

1. How can identification of similar items in a procurement group be incorporated into the Standard Automated Materiel Management System (SAMMS)?
2. Can the SAMMS be programmed to review all items in the group for potential procurement when a single line item in the group breaches its reorder point?
3. Should items in the procurement group be segregated so that only a single item manager is responsible?
4. What type of procurement tool is best suited for the procurement group buying concept?
5. How can the items in the procurement group be segregated so that only a single buyer is responsible for soliciting bids?

The identification of similar items in a procurement group can be entered in the Standard Automated Materiel Management System (SAMMS) by use of a Procurement Group Code (PGC) and a corresponding policy table. A specific PGC must be assigned to each item in the group and each item in the group must be identified to the PGC in the policy table.

The SAMMS is already programmed to review all items in a group for potential procurement when a single line item in the group breaches its reorder point by use of the PGC, policy table, and Minimum Procurement Cycle (MPC). As one item in the group breaches its reorder point, the system identifies if it has an assigned PGC and is thus a member of a group. If it is a member of a group, the policy table is then scanned to identify the other members of the group. Next, all members in the group are reviewed to determine which ones will meet their reorder points within the MPC time frame. Finally, a buy recommendation is generated for all items that meet these prerequisites.

Currently, items at DESC are assigned to the item managers based on dollar value and frequency of demand. The higher value/frequency items are assigned to the higher graded, more experienced item managers. In discussing the need for a single item manager for each procurement group the supervisory supply systems analyst in the supply directorate presented two options. One, the existing system of assigning item managers could be used for procurement groups. Even though different item managers would be

responsible for various items, a purchase request (PR) would not be generated until item managers acted on all the items in the group. Second, a single item manager could be assigned to each procurement group; however, this option would require a change in the existing system for assigning item managers.

Discussions with contracting officers in the procurement directorate revealed that there is no one procurement tool that is best suited for all types of procurement group buying. For buys with a dollar value equal to or less than \$25,000 a purchase order should be used. For buys in which the dollar value exceeds \$25,000 a contract should be used. A specific contract type that may be used for annual procurements of the group is an Indefinite Quantity (IQ) contract. Basic Ordering Agreements (BOAs) may be used when a number of contracts are anticipated with a sole source to specify terms and clauses that may be invoked in each contract.

Finally, discussions with contracting officers in the procurement directorate indicated that there were two options to ensure that a single buyer was responsible for soliciting bids on a procurement group. First, the contracting officer could manually sort the purchase requests and assign the work to one buyer. This manual sort is currently being used in the limited procurement group

effort on circuit breakers previously discussed. A second easier system would be to have purchase requests collected by procurement groups by the SAMMS. These system grouped purchase requests could then be assigned to a single buyer.

IV. Conclusions and Recommendations

Conclusions and recommendations based on the data collected and analyzed in Chapter III are presented in this chapter. This chapter is divided into two sections, Conclusions and Recommendations. In the conclusions section specific points regarding the feasibility of each of the five test groups are presented in addition to specific conclusions regarding the feasibility of the procurement group concept in general. The recommendations section concentrates on three specific areas: recommendations regarding pilot studies on the test groups, recommendations regarding further exploration of the annual procurement concept, and recommendations regarding other military specifications that should be investigated for the procurement group concept.

Conclusions

Conclusions on the Test Groups. The two MIL-R-39007 final procurement groups (see Appendix B) have a limited potential for application of the procurement group concept. Procurement Group 1 contained 253 separate line items with a resulting Annual Demand Quantity of 98,276, and an Annual Demand Value of \$72,201.84. Procurement Group 2 contained 78 separate line items with a resulting Annual Demand Quantity of 36,142, and an Annual Demand Value of

\$31,501.88. Although both groups have relatively high Annual Demand Quantities, the dollar values of items in question are relatively low reflecting the fact that these components have low unit prices (e.g., average less than a dollar). As a result, simple grouping of purchase requests as they are generated by the SAMMS would seem to have little benefit from a cost savings standpoint. A means of increasing the amount of savings would be to use an annual procurement concept as recommended by the contracting officer for resistors in the procurement directorate. In theory, the annual demand requirements would be estimated for every item in the group and for the total group. This estimated annual requirement would be the basis for a contract with a manufacturer at prices that would reflect quantity discounts for the group. Thus, annual procurements should result in cost savings and a substantial reduction in the number of buys.

However, annual procurement for a group of items is an unproven concept and is not currently being used at DESC. Annual procurement of a group of items would require that the items have a relatively stable demand so that annual requirements could be adequately forecasted for the items and subsequently the group.

Another problem area with the two groups defined for MIL-R-39007 is their relative stability over time. The major difference between the two groups centers on the division by failure rate level R and failure rate level S

(i.e., Procurement Group 1 has R parts and Procurement Group 2 has S parts). The failure rate level S is the tighter failure rate at 0.001 percent failures/1000 hours whereas failure rate level R is only 0.01 percent failures/1000 hours. As time goes on, more of the R failure rate parts will be deleted from the system in favor of the better S failure rate parts. Thus, over time, Procurement Group 1 will progressively shrink as Procurement Group 2 becomes larger. This ongoing replacement action will require close monitoring of the two procurement groups so that deleted R failure rate level parts are removed from the one group and superseding S failure rate parts are added to the other. Eventually, all parts should be taken over to S failure rate and there would only be a need for one procurement group. Thus, as a result of the data obtained in the research effort, the two procurement groups under MIL-R-39007 have limited potential for group procurement because: (1) the need to use the annual procurement which is an unproven concept, and (2) the instability of the currently defined procurement groups.

The MIL-R-39008 preliminary group (see Table III) has minimal potential for application of the procurement group concept. The major stumbling block occurred because the sole manufacturing source refused to participate in group procurements. However, it was noted that most DESC buys for these items occur through distributors. Unfortunately, time did not permit follow-on contacts with these distributors to

determine their interest in the concept. Thus, based primarily on the input received from the sole manufacturing source it was concluded that there was little or no potential for the concept for MIL-R-39008.

The MIL-C-39003/1 final procurement groups (see Appendix B) have minimal potential for application of the procurement group concept. Inputs received from the manufacturers resulted in dividing the initial single group (see Table IV) into thirteen smaller procurement groups. Of these thirteen groups only seven groups had Annual Demand Quantities exceeding 10,000 pieces and Annual Demand Values exceeding \$10,000. However, subsequent interviews with the manufacturers revealed that only one manufacturer indicated that quantity discounts might be available while all other manufacturers stated that prices were at their lowest at the present time. Thus, because of the division of the initial group into thirteen smaller groups with substantially smaller demand and dollar value, and because the majority of manufacturers indicated that quantity discounts would not be available, it was concluded that there was minimal potential for the group procurement concept for MIL-C-39003/1.

The two MIL-C-39014 final procurement groups (see Appendix B) have potential for application of the procurement group concept. However, like the MIL-R-39007 groups, the highest potential for cost savings would occur via annual procurements. Again this situation occurs because the items in these groups are also low unit price,

high volume items. Thus, annual procurements should result in cost savings and substantial reduction in the number of buys. Furthermore, a majority of the manufacturers interviewed expressed support for the concept in addition to affirming the availability of quantity discounts. Thus, the group does have potential for the application of the procurement group concept with maximum benefits occurring under an annual procurement.

The two MIL-C-39019 procurement groups (see Appendix B) appear to have the greatest potential for savings. The contracting officer for circuit breakers is currently using a group buying concept on a limited scale by grouping buys for this specification as they arrive in the procurement directorate. Using the SAMMS to group purchase requests for these procurement groups would increase the potential for savings. Both manufacturers with qualified products for this specification agreed to provide discounts on the group rather than by individual item. Thus, because the items in these groups have higher unit prices and high volume, the existing supply system can be used to group purchase requests and still result in savings even greater than those being experienced currently by buying items in groups. As stated in Chapter III, savings of approximately \$15,000 have been documented for the first two months of this limited scale group buying effort. Based on these documented savings, it is estimated that annual savings from an expanded group buying effort would exceed \$90,000 per year.

General Conclusions. The procurement group buying concept appears to be feasible for electronic parts and to offer potential for savings under the following conditions:

1. The items in the group have very similar electrical and physical characteristics such as those manufactured in compliance to the five military specifications selected for this thesis.
2. The manufacturers with qualified products for the selected military specification indicate an interest in the concept and are willing to provide quantity discounts for the group.
3. The final groups contain enough items with sufficiently large annual demand quantities so that buys for the group qualify for the quantity discount breaks established by the manufacturers.

As a result of analyzing the five preliminary groups, selected for this thesis, it was discovered that each group of items had different sets of characteristics (i.e., the number of manufacturers with qualified products, the number of National Stock Numbers in the group, the Annual Demand Quantity, and the Annual Demand Value of the items in the group and for the group as a whole). Therefore, in selecting groups of items for the procurement group concept, a methodology similar to that outlined in Chapter II should be employed.

The unit price and volume of items in the group played an important part in the potential of the test groups for the group procurement concept. Four of the five military specifications (i.e., MIL-R-39007, MIL-R-39008, MIL-C-39003/1, and MIL-C-39014) chosen for review contained low unit prices (i.e., average unit price less than one dollar) and relatively high volumes. In these cases, the

procurement group concept appeared most feasible if an annual procurement could be accomplished. However, as previously discussed, annual procurements of groups of items at DESC is an unproven concept and carries with it the risks of overestimation of demand resulting in too much inventory or underestimation of demand which results in additional buys. The MIL-C-39019 final test groups contained higher unit price items (e.g, average unit price of \$27 for Procurement Group 1 and \$59 for Procurement Group 2) and high volume that could still result in cost savings by grouping purchase requests, a procedure that can be readily implemented with the existing DESC system. As a result, it was concluded that the procurement group concept appeared most feasible on higher unit price military specifications that cover a family of items.

There are two options available for implementing the procurement group concept within the DESC supply directorate. The first option involves using the SAMMS to group purchase requests (PRs) for items in the group. This option is accomplished by assigning a Procurement Group Code (PGC) and Minimum Procurement Cycle (MPC) to the group and then entering the group into a policy table. Buys would then generate for the group when one item in the group breaches its reorder point. The buys would include the requirements for all items in the group that are within the MPC of their respective reorder points. The second option would be annual procurements using an Indefinite Quantity

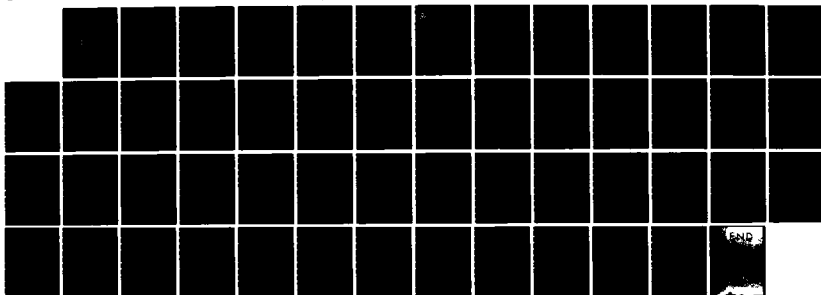
AD-A147 390

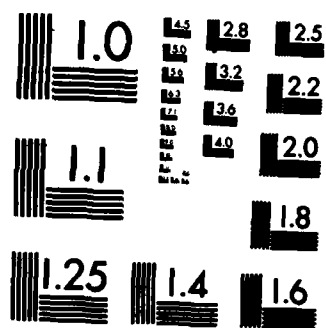
ANALYSIS AND GUIDELINES FOR THE PROCUREMENT OF
ELECTRONIC COMPONENTS IN G. (U) AIR FORCE INST OF TECH
WRIGHT-PATTERSON AFB OH SCHOOL OF SYST. R W GAEKE
SEP 84 AFIT/GLM/LSM/845-25 F/G 15/5

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contract based on the quantity of the group whereby a contract is awarded for the estimated annual requirements and, as individual items in the group breach their reorder point, orders are placed with the manufacturer.

In regard to the procurement tool best suited for the procurement group concept, it was found that there is no one best tool. The procurement tool selected for a particular test group depends on the characteristics of the group of items. These characteristics include unit price, Annual Demand Quantity, Annual Demand Value, the average dollar amount of the buy, and the number of sources. The unit price, Annual Demand Quantity, and Annual Demand Value impact the average dollar amount of the buy which impacts the procurement tool used. If the dollar amount of the buy is equal to or less than \$25,000, a purchase order should be used. If the dollar amount of the buy exceeds \$25,000, a contract should be used. A specific contract type that may be used for annual procurements of the group is an Indefinite Quantity (IQ) contract. Basic Ordering Agreements (BOAs) may be used when a number of contracts are anticipated with a sole source to specify terms and clauses that may be invoked in each contract.

Recommendations

As a result of this thesis effort, a pilot study on the two MIL-C-39019 test groups should be implemented. Prior to actual implementation, however, the National Stock Number

listing for the two groups should be provided to the Directorate of Technical Operations to ensure that there would be no reason for a purchase request (PR) for any item in the group to be reviewed for adequacy of data. Although this problem should not occur on these military specifications, it is prudent to verify that this will not be a problem. The problem that occurs is that the PR must be sent to the Directorate of Technical Operations for review. Obviously, if one PR out of a group of PRs is held for further action, the resulting group procurement is delayed until all PRs can be processed together. After accomplishing this preliminary review, Procurement Group Codes (PGCs) should be assigned to Procurement Group 1 and Procurement Group 2 for MIL-C-39019 as identified in Appendix B. It is recommended that the Minimum Procurement Cycle (MPC) for the groups should be in the range of one to three months and be closely monitored to ensure that the buys for the group be sufficiently large to reach the threshold quantities of 250, 500, or 1000 pieces without buying the individual items too frequently. Management of this pilot study should be assigned to a task group that would have the responsibility for accomplishing the effort and resolving problems as they occur. The task group should be composed of individuals from all DESC directorates that would be involved in the effort.

Although the sole manufacturer for the MIL-R-39008 test group was not interested in the procurement group concept,

it might still prove to be feasible to implement the procurement group buying concept via authorized distributors. MIL-R-39008 still remains an attractive test group because of the high volume of parts (i.e., approximately five million pieces) and high dollar value estimated to be at least \$500,000. As previously discussed, the contracting officer in the procurement directorate indicated the most buys of MIL-R-39008 are accomplished through distributors. These authorized distributors for MIL-R-39008 parts are listed in the Qualified Products List for this specification. It is recommended that the authorized distributors for MIL-R-39008 be contacted to determine their interest in the concept and, if sufficient interest exists, action should be taken to implement a group procurement for these items.

In regard to the final test groups for MIL-R-39007 and MIL-C-39014, application of the procurement group concept depends on the ability to make annual procurements. However, before annual procurements are undertaken, additional work regarding the procurement history of these items should be performed. The annual procurement concept appears feasible for items that have a relatively stable demand which, in turn, allows more accurate forecasting of demand for the items and the group. The recent procurement history for each item in the group should be reviewed in order to determine the stability of demand. If demand is stable then steps can be taken to consider implementing

annual procurements on the final procurement groups. Of the two groups, MIL-R-39007 presents more problems because of the previously discussed replacement action on R failure rate parts. Thus, the MIL-C-39014 test groups should be the first groups implemented.

As stated in the conclusions, the procurement group concept appears better suited for higher dollar items (e.g., circuit breakers). As a result, it is recommended that future test groups be picked from military specifications meeting this criteria so as to maximize the cost savings. Specific military specifications that could be reviewed that meet this criteria include the following:

1. MIL-C-5809.
2. MIL-C-55629.
3. MIL-R-19.
4. MIL-R-94.
5. MIL-C-39006.

However, if future research indicates that annual procurements are feasible for the MIL-R-39007 and MIL-C-39014 procurement groups identified herein, additional military specifications on low unit price, high volume items should be investigated. Specific military specifications that could be reviewed that meet this criteria include:

1. MIL-R-39005.
2. MIL-R-39017.
3. MIL-R-55182.

In reviewing future groups of parts under military specification, a methodology similar to that outlined in Chapter II should be used.

Appendix A: Sample Letter, Questionnaire, and Test Group Profile



DEFENSE LOGISTICS AGENCY
DEFENSE ELECTRONICS SUPPLY CENTER
DAYTON, OH 45444

IN REPLY
REFER TO DESC-E (EMM/Mr. Moore/513-296-6160/kdf)

SUBJECT: Group Procurement of Electronic Components Covered by MIL-C-39003,
Capacitors, Fixed, Electrolytic, Tantalum, General Specification For

Dear:

Reference telecon with Mr. David E. Moore of this Center on 11 May 84 in regard to the concept of group procurement.

Mr. Moore and Mr. Gaeke of this Center are investigating the feasibility of the procurement group buying concept as part of their thesis effort.

The procurement group buying concept consists of buying electronic components with similar characteristics as a group. DESC currently procures electronic components on a single line-item-by-line-item basis. Thus, as each line item reaches its reorder point, bids are solicited for that line item only. However, many of the electronic components that DESC purchases are part of distinct families of items and, as such, are very similar to other electronic components that are being procured. The objective of the procurement group buying concept is to manage and procure items that have very similar electrical and physical characteristics as a group.

To analyze the feasibility of the procurement group buying concept it is necessary to select potential test groups of components. As a starting point, a set of existing military specifications were selected. In particular, military specifications were selected that cover a family of components and have qualified products.

MIL-C-39003 has been selected as a test group for further analysis. As a manufacturer for qualified products under this specification, we are interested in your opinions to the questions in the attached questionnaire, Enclosure 1.

SUBJECT: Group Procurement of Electronic Components Covered by MIL-C-39003

For example, under the existing system whenever a single capacitor hits its reorder point (e.g., M39003/01-5694) a solicitation is issued for the single line item. An alternate procedure would be to develop a procurement group of similar capacitors (e.g., all parts under MIL-C-39003/1). Whenever a single item in the group hits its reorder point, all items in the group will be reviewed to determine how close other parts in the group are to their reorder point.

In order to meet current time requirements for this study, Mr. David E. Moore or Mr. Robert Gaeke will contact you within two weeks from the date of this letter by telephone to document your opinions.

The identity of your company will not be disclosed in the report which will summarize opinions on the procurement group buying concept. In addition, the information received from the telephone interview will be considered only as an opinion and not as a commitment by your company on the procurement group buying concept.

Finally, as an aid in considering the procurement group buying concept, a profile of the test groups is enclosed for your information, Enclosure 2. This profile is an estimate of the total number of items in the group, total annual demand quantity, the range of annual demand quantities, and the expected number of solicitations annually under the existing procurement system. Also, in the interest of accuracy we ask that you follow up with the interview with a written response.

Sincerely,

2 Encl

INTERVIEW QUESTIONS

1. Would your company be willing to participate in a group procurement on military specifications items for which you are qualified?

Yes ()

No () Please provide details.

2. Would your company prefer bidding on items in groups versus the current practice of bidding on individual items?

Yes ()

No () Please provide details.

ANSWER QUESTIONS 3 THROUGH 6 ONLY IF THE RESPONSE TO QUESTION 1 WAS "YES".

3. If your company is willing to participate in the procurement group buying concept, would this result in prices based on the total quantity of the group rather than the quantity of each item (i.e., quantity discounts)?

Yes ()

No () Please provide details.

4. Would your company be willing to provide a price list which details the quantity discounts that would be available for the procurement group?

Yes ()

No () Please provide details.

5. If your company is able to save time, effort, and money on paperwork and documentation through the procurement group buying concept would you pass part of this savings on to the Government through lower prices or discounts?

Yes ()

No () Please provide details.

6. Would your company have any recommendations regarding the composition of the procurement group different from that originally defined (e.g., Would you prefer to provide only specific specification sheets, tolerances, etc.)?

Yes () Please provide details.

No ()

TEST GROUP PROFILE

1. MIL SPEC/STYLE: _____

2. TOTAL NUMBER OF ITEMS: _____

3. TOTAL ANNUAL DEMAND QUANTITY: _____

4. RANGE OF ANNUAL DEMAND QUANTITIES:

<u>RANGE</u>	<u>NUMBER OF ITEMS</u>
0 - 9	_____
10 - 24	_____
25 - 49	_____
50 - 99	_____
100 - 499	_____
500 - 999	_____
1000 & Over	_____

5. NUMBER OF BUYS/SOLICITATIONS EXPECTED PER YEAR UNDER EXISTING PROCUREMENT
SYSTEM: _____

Appendix B: Procurement Group Tables

TABLE B.1

MIL-R-39007 Procurement Group 1

MILITARY PART NUMBER	NSN (5905-)	ADQ	ADV
RWR74S2R00FR	00-721-3800	358	318.62
RWR74SR100FR	00-422-0308	172	197.80
RWR74SR200FR	00-162-3879	612	428.40
RWR74SR221FR	00-564-3964	238	233.24
RWR74SR249FR	01-022-7423	133	148.96
RWR74SR332FR	00-462-6014	159	171.72
RWR74SR499FR	00-689-1860	1012	678.04
RWR74S1R00FR	00-445-6420	4576	3020.16
RWR74S10R0FR	00-491-2764	727	683.38
RWR74S1000FR	00-140-6364	416	370.24
RWR74S1001FR	00-038-5916	920	1720.40
RWR74S1002FR	00-147-9852	349	314.10
RWR74S12R4FR	00-370-1274	175	192.50
RWR74S1470FR	00-758-4617	134	159.46
RWR74S1500FR	00-098-9539	512	455.68
RWR74S1621FR	00-430-8106	113	106.22
RWR74S1780FR	00-761-6868	268	230.48
RWR74S2R21FR	00-932-4973	119	115.43
RWR74S20R0FR	00-491-2765	134	89.78
RWR74S2001FR	00-828-2492	114	212.04
RWR74S2151FR	00-576-5137	101	70.70
RWR74S2490FR	00-203-5400	444	297.48
RWR74S3R01FR	00-568-2441	141	138.18
RWR74S30R1FR	00-237-1313	206	144.20
RWR74S3321FR	00-553-8520	234	226.98
RWR74S35R7FR	00-472-3630	139	458.70
RWR74S4020FR	00-422-3699	198	138.60
RWR74S4021FR	01-011-1609	162	160.38
RWR74S49F9FR	00-491-2766	270	302.40
RWR74S4990FR	00-403-4086	124	101.68
RWR74S4991FR	00-335-8733	550	368.50
RWR74S5111FR	00-491-9072	209	146.30

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR74S5621FR	00-328-1421	123	115.62
RWR74S6041FR	00-576-5142	197	131.99
RWR74S6981FR	00-451-5769	1730	1159.10
RWR74S75R0FR	00-230-7657	415	278.05
RWR74S7530FR	00-284-9944	145	118.90
RWR74S8250FR	00-195-6408	146	271.56
RWR74S86R6FR	00-368-2581	182	156.52
RWR74S9091FR	00-328-4085	107	95.23
RWR78S1R00FR	00-478-7287	143	393.25
RWR78S10R0FR	00-236-8085	344	419.68
RWR78S1000FR	00-478-7288	135	136.35
RWR78S1002FR	00-430-7773	272	184.96
RWR78S1212FR	01-026-9106	162	158.76
RWR78S15R0FR	00-205-9011	122	143.96
RWR78S1501FR	00-357-3093	161	189.98
RWR78S2000FR	00-780-8763	107	112.53
RWR78S2491FR	00-467-1508	184	125.12
RWR78S2671FR	00-448-5539	136	140.08
RWR78S3011FR	00-208-3946	133	192.85
RWR78S4R99FR	00-509-5336	185	218.30
RWR80SR232FR	00-163-7146	139	225.18
RWR80SR316FS	00-407-0301	207	539.79
RWR80SR392FR	00-001-7424	125	98.75
RWR80SR750FR	00-327-9670	186	130.20
RWR80SR953FR	01-017-2883	139	87.57
RWR80S1R30FR	00-563-0012	258	286.38
RWR80S1R50FR	00-470-0147	327	264.87
RWR80S1100FR	00-477-8091	182	131.04
RWR80S1210FR	00-466-1475	137	98.64
RWR80S1211FR	00-024-0695	122	104.92
RWR80S1371FR	00-412-0849	100	74.00
RWR80S15R0FR	00-482-3335	161	140.07
RWR80S1540FR	00-409-1059	170	134.30
RWR80S1541FR	00-137-4828	240	172.80

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR80S1821FR	00-243-9028	374	228.14
RWR80S1870FR	00-472-0075	136	103.36
RWR80S1960FR	00-256-9265	205	125.05
RWR80S2R00FR	00-241-3008	2564	1512.76
RWR80S2R43FR	01-035-0182	159	114.48
RWR80S2000FR	00-401-7456	375	270.00
RWR80S2001FR	00-401-7457	155	94.55
RWR80S22R1FR	00-564-3967	236	169.92
RWR80S2211FR	00-445-1711	126	99.54
RWR80S27R4FR	00-497-4317	294	211.68
RWR80S3R01FR	00-146-3901	472	339.84
RWR80S30R1FR	00-872-5907	1507	1085.04
RWR80S31R6FR	00-175-4290	1477	1240.68
RWR80S3240FR	01-035-4494	105	65.10
RWR80S33R2FR	00-368-2585	224	138.88
RWR80S3320FR	00-031-3952	1221	744.81
RWR80S3650FR	00-409-3414	120	111.60
RWR80S38R3FR	00-112-2206	157	113.04
RWR80S3920FR	00-138-1171	121	75.02
RWR80S4R75FR	00-401-7795	124	86.80
RWR80S4R87FR	00-359-5224	106	152.64
RWR80S40R2FR	00-434-3161	217	156.24
RWR80S47R5FR	00-401-7462	157	128.74
RWR80S49R9FR	00-408-5254	274	221.94
RWR80S5R11FR	00-121-6329	421	303.12
RWR80S5R49FR	00-481-1298	126	110.88
RWR80S5R90FR	00-026-9358	167	120.24
RWR80S6040FR	00-137-4832	288	207.36
RWR80S61R9FR	00-139-9878	101	82.82
RWR80S6190FR	00-150-1287	172	123.84
RWR80S63R4FR	00-481-1112	170	103.70
RWR80S6490FR	00-445-6421	153	113.22
RWR80S68R1FR	00-490-7983	225	162.00
RWR80S7R15FR	00-256-2503	140	110.60
RWR80S75R0FR	00-758-6760	629	383.69

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR80S7500FR	00-422-0311	164	100.04
RWR80S80R6FR	01-033-9945	1374	838.14
RWR80S8250FR	00-199-6936	691	421.51
RWR81SR100FR	00-466-1481	554	376.72
RWR81SR464FR	00-179-0752	108	76.68
RWR81SR499DS	01-075-6749	126	312.48
RWR81SR511FR	00-758-5810	252	153.72
RWR81SR681FR	00-583-8859	105	113.40
RWR81S1R21FR	00-402-1057	188	133.48
RWR81S1R50FR	00-402-7134	150	102.00
RWR81S1R65FR	00-107-4483	106	66.78
RWR81S10R0FR	00-974-6796	1103	794.16
RWR81S1050FR	00-521-2501	102	72.42
RWR81S1470FR	00-784-4451	153	93.33
RWR81S15R4FR	00-451-1463	226	142.38
RWR81S1500FR	00-470-9286	716	486.88
RWR81S2000FR	00-409-5457	276	168.36
RWR81S2050FR	00-442-6704	155	127.10
RWR81S22R6FR	00-444-5312	115	90.85
RWR81S3R32FR	00-138-3341	115	106.95
RWR81S30R1FR	00-480-5198	269	215.20
RWR81S4R75FR	00-588-8332	109	88.29
RWR81S4R99FR	00-468-2969	326	221.68
RWR81S40R2FR	00-480-5199	212	169.60
RWR81S51R1FR	00-471-5138	236	160.48
RWR81S56R2FR	00-408-8663	191	129.88
RWR81S61R9FR	00-426-9630	133	90.44
RWR81S71R5FR	00-156-6391	100	68.00
RWR81S8R25FR	00-208-4335	126	122.22
RWR81S8250FR	00-470-1542	105	79.80
RWR84S1R00FR	00-237-2058	820	770.80
RWR84S1000FR	00-482-7807	1057	1109.85
RWR84S1001FR	00-165-8891	335	234.50
RWR84S1002FR	00-270-1918	753	512.04
RWR84S1780FR	00-156-6381	157	169.56

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR84S2491FR	00-023-1628	177	173.46
RWR84S3010FR	00-325-6874	236	561.68
RWR84S3570FR	00-499-6936	771	809.55
RWR84S4020FR	01-011-1611	137	132.89
RWR84S47R5FR	00-356-7911	105	114.45
RWR84S6711FR	00-632-8383	300	324.00
RWR89SR178FR	00-572-4668	273	218.40
RWR89SR200FR	00-472-1068	177	111.51
RWR89SR226FR	00-478-1065	563	405.36
RWR89SR237FR	00-368-2587	216	164.16
RWR89SR249FR	00-761-6877	204	128.52
RWR89SR267FR	01-074-3410	104	82.16
RWR89SR332FR	00-481-1118	181	137.56
RWR89SR357FR	01-011-1617	468	299.52
RWR89SR402FR	00-004-7655	177	107.97
RWR89SR499FR	00-426-2005	995	606.95
RWR89SR562FR	00-274-2410	263	302.45
RWR89SR750FR	00-250-2971	222	177.60
RWR89SR806FR	00-189-0735	128	135.68
RWR89S1R00FR	00-431-5225	3471	2637.96
RWR89S1R24FR	00-247-4274	226	171.76
RWR89S1R47FR	00-576-5251	283	234.89
RWR89S1R50FR	00-466-1486	487	297.07
RWR89S1000BR	00-576-5360	124	200.88
RWR89S1000FR	00-409-3415	1639	1180.08
RWR89S1050FR	00-572-5075	197	120.17
RWR89S1100FR	00-006-6951	780	475.80
RWR89S1130FR	00-478-5869	248	181.04
RWR89S1150FR	00-409-5460	165	100.65
RWR89S1180FR	01-030-7375	285	370.50
RWR89S1211FR	00-433-5734	374	269.28
RWR89S1240FR	00-140-3186	586	369.18
RWR89S1241FR	00-549-1419	159	128.78
RWR89S13R0FR	00-565-7889	150	105.00
RWR89S1301FR	00-006-6952	315	255.15
RWR89S1330FR	00-723-9370	807	645.60
RWR89S14R0FR	00-009-9928	112	85.12

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR89S1400FR	00-433-6244	210	144.90
RWR89S1401FR	00-767-0920	184	165.60
RWR89S1430FR	01-076-9231	430	348.30
RWR89S1470FR	00-238-6406	256	161.28
RWR89S1471FR	00-466-1490	218	172.22
RWR89S15R0FR	00-412-0406	261	187.92
RWR89S1500FR	00-096-3239	1454	886.94
RWR89S1541FR	00-147-9856	699	503.28
RWR89S1620FR	00-199-7477	210	172.20
RWR89S17R8FR	00-448-5784	143	102.96
RWR89S1740FR	00-478-7528	206	156.56
RWR89S18R2FR	00-038-5930	127	100.33
RWR89S1821FR	00-140-6161	235	232.65
RWR89S19R1FR	01-019-4998	254	429.26
RWR89S19R6FR	01-037-5086	200	162.00
RWR89S1911FR	00-003-5787	168	120.96
RWR89S2R49FR	00-442-7428	429	334.62
RWR89S2R80FR	00-466-1491	499	379.24
RWR89S2001FR	00-444-5484	794	619.32
RWR89S22R1FR	00-241-3157	223	173.94
RWR89S2261FR	00-328-2239	290	194.30
RWR89S24R9FR	00-433-6506	359	218.99
RWR89S2430FR	00-454-8349	143	95.81
RWR89S2431FR	00-466-1493	133	81.13
RWR89S2490FR	00-482-7728	246	191.88
RWR89S2491FR	00-024-0737	180	140.40
RWR89S2610FR	00-199-7482	160	97.60
RWR89S2611FR	00-032-9629	126	105.84
RWR89S2670FR	00-443-9082	108	82.08
RWR89S2671FR	00-352-8926	117	91.26
RWR89S2740FR	00-481-7883	247	192.66
RWR89S2801FR	01-047-7507	238	257.04
RWR89S2871FR	00-583-8726	130	92.30
RWR89S29R4FR	01-008-5741	141	115.62
RWR89S3R01FR	00-147-7121	864	527.04
RWR89S3R32FR	00-140-9131	275	173.25
RWR89S30R1FR	00-112-2198	222	173.16

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR89S3010FR	00-407-5473	400	244.00
RWR89S3011FR	00-466-1494	670	536.00
RWR89S3090FR	00-445-1690	161	98.21
RWR89S3091FR	00-035-4339	127	101.60
RWR89S32R4FR	00-689-4733	165	138.60
RWR89S3241FR	00-581-4497	142	107.92
RWR89S33R2FR	00-409-3416	242	162.14
RWR89S34R0FR	00-564-2838	205	127.10
RWR89S3480FR	00-199-7489	523	319.03
RWR89S35R7FR	00-574-4327	233	233.00
RWR89S3570FR	00-408-5257	274	221.94
RWR89S38R3FR	00-560-2252	274	172.62
RWR89S3830FR	00-199-7492	181	146.61
RWR89S3831FR	00-332-0013	101	81.81
RWR89S3920FR	00-252-4303	178	144.18
RWR89S3921FR	01-022-7432	227	177.06
RWR89S4R02FR	00-471-2458	509	310.49
RWR89S4R99FR	00-432-6329	504	362.88
RWR89S40R2FR	00-547-9312	123	88.56
RWR89S4020FR	00-006-9039	264	179.52
RWR89S4021FR	00-566-5138	106	84.80
RWR89S42R2FR	00-176-2265	187	114.07
RWR89S4220FR	00-199-7493	342	208.62
RWR89S4320FR	00-627-1137	111	69.93
RWR89S4420FR	00-267-2021	225	162.00
RWR89S45R3FR	00-549-1618	150	111.00
RWR89S4640FR	00-032-9630	360	219.60
RWR89S4750FR	00-466-1499	575	350.75
RWR89S49R9FR	00-434-9145	372	297.60
RWR89S4990FR	00-242-2019	786	628.80
RWR89S5R11FR	00-689-4699	1079	776.88
RWR89S51R1FR	00-407-0124	1356	854.28
RWR89S52R3FR	00-001-8493	122	87.84
RWR89S53R6FR	00-628-5444	216	151.20
RWR89S54R9FR	00-632-7320	102	91.80
RWR89S5490FR	00-632-7400	226	151.42
RWR89S57R6FR	00-572-4958	291	194.97

TABLE B.1

MIL-R-39007 Procurement Group 1 (continued)

RWR89S59R0FR	00-626-1350	801	488.61
RWR89S5900FR	00-565-7886	190	119.70
RWR89S6R04FR	01-009-3543	191	131.79
RWR89S6R98FR	01-008-5742	235	178.60
RWR89S60R4FR	01-045-9223	667	520.26
RWR89S6040FR	00-199-5307	702	428.22
RWR89S61R9FR	00-517-9358	223	160.56
RWR89S6190FR	00-403-4543	425	259.25
RWR89S63R4FR	01-139-1935	134	84.42
RWR89S6340FR	00-832-8257	136	82.96
RWR89S6490FR	00-005-2715	142	86.62
RWR89S6650FR	00-630-5254	285	179.55
RWR89S6810FR	00-012-3895	861	525.21
RWR89S69R8FR	01-099-8205	362	246.16
RWR89S7320FR	00-632-7321	218	137.34
RWR89S7500FR	00-101-1861	225	162.00
RWR89S7680FR	00-632-5235	428	269.64
RWR89S8R06FR	01-006-7650	191	145.16
RWR89S80R6FR	00-140-5761	269	209.82
RWR89S8060FR	00-172-8032	387	236.07
RWR89S84R5FR	00-576-5149	147	119.07
RWR89S9R09FR	00-501-1608	139	108.42
RWR89S90R9FR	00-098-9554	191	148.98
RWR89S9090FR	00-279-1581	665	485.45
Total	253 <u>1/</u>	98276	\$72201.84

1/ Total number of NSNs.

TABLE B.2

MIL-R-39007 Procurement Group 2

MILITARY PART NUMBER	NSN (5905-)	ADQ	ADV
RWR74S2000FS	01-101-3875	675	592.72
RWR74S24R9FS	01-141-5515	179	186.36
RWR74S8251FS	01-052-7182	235	218.55
RWR78S1001FS	01-142-1475	245	344.05
RWR78S1622FS	01-161-9537	161	191.59
RWR80SR100FS	01-110-3091	740	555.14
RWR80SR200FS	01-133-3842	365	263.06
RWR80SR511FS	01-115-0696	139	102.29
RWR80SR619FS	01-051-3167	193	211.50
RWR80S10R0FS	01-145-7965	2026	3632.64
RWR80S1000FS	01-160-6188	740	471.82
RWR80S1001FS	00-513-2874	1831	1318.32
RWR80S1500FS	01-101-7558	313	232.17
RWR80S1501FS	01-117-0555	282	273.51
RWR80S1621FS	01-126-4687	176	161.11
RWR80S20R0FS	01-081-3610	314	292.63
RWR80S2210FS	01-168-3213	130	146.80
RWR80S2430FS	01-163-3113	103	108.15
RWR80S2670FS	01-165-1701	184	132.48
RWR80S2671FS	01-049-2089	133	123.40
RWR80S3010FS	01-068-2450	317	231.16
RWR80S4R99FS	01-084-1894	193	220.98
RWR80S4020FS	01-126-4689	125	115.70
RWR80S4640FS	01-162-3934	152	120.80
RWR80S4990FS	01-158-2302	254	197.87
RWR80S51R1FS	01-109-8890	145	88.54
RWR80S5110FS	01-149-2078	365	261.36
RWR80S5620FS	01-126-4686	275	267.58
RWR80S6810FS	01-084-5892	534	421.96
RWR81SR249FS	01-162-3933	134	146.06
RWR81SR301FS	01-161-3192	1186	1275.29
RWR81SR499FS	01-097-1613	442	453.73

TABLE B.2

MIL-R-39007 Procurement Group 2 (continued)

RWR81S1R00FS	01-046-0479	1641	1432.32
RWR81S1000FS	01-106-0666	1472	1094.16
RWR81S1210FS	01-106-0661	542	373.28
RWR81S1240FS	01-106-0662	255	215.19
RWR81S1400FS	01-106-1656	399	275.73
RWR81S15R0FS	01-161-0862	1014	1473.20
RWR81S2R00FS	01-043-7302	820	663.98
RWR81S20R0FS	01-106-1657	377	257.37
RWR81S2430FS	01-081-4630	149	185.23
RWR81S2740FS	01-081-4633	135	142.66
RWR81S3R01FS	01-117-0554	232	266.23
RWR81S3320FS	01-106-3821	350	241.03
RWR81S3920FS	01-106-0659	117	128.13
RWR81S4R87FS	01-081-3609	202	176.80
RWR81S4020FS	01-049-2090	104	101.99
RWR81S4420FS	01-106-3825	112	105.68
RWR81S4530FS	01-106-4469	169	128.44
RWR81S5R11FS	01-097-1621	186	420.70
RWR81S5320FS	01-106-3825	181	128.68
RWR81S5620FS	01-106-4470	210	192.21
RWR81S57R6FS	01-106-4472	140	81.20
RWR81S5900FS	01-106-3830	184	145.36
RWR81S6R81FS	01-106-5201	127	79.21
RWR81S66R5FS	01-106-5197	115	106.95
RWR81S90R9FS	01-066-7096	121	125.90
RWR84SR100FS	01-084-5893	494	738.17
RWR89SR100FS	01-099-8947	1287	1035.82
RWR89SR150FS	01-137-5188	236	187.58
RWR89SR301FS	01-143-1737	266	216.50
RWR89SR475FS	01-132-1491	214	166.92
RWR89SR681FS	01-147-8915	168	194.82
RWR89S10R0FS	01-084-5886	4418	3915.36
RWR89S1001FS	01-110-3094	2423	1925.14
RWR89S1210FS	01-145-7964	1007	813.18
RWR89S1501FS	01-136-8240	477	342.00
RWR89S2R00FS	01-097-1620	704	562.76
RWR89S20R0FS	01-142-7165	373	285.84
RWR89S2000FS	01-129-3286	963	708.48

TABLE B.2

MIL-R-39007 Procurement Group 2 (continued)

RWR89S2211FS	01-150-3461	567	460.96
RWR89S3481FS	01-074-4432	262	204.36
RWR89S47R5FS	01-074-4423	403	378.82
RWR89S5110FS	01-097-1623	227	244.94
RWR89S56R2FS	01-133-0536	203	160.37
RWR89S68R1FS	01-137-8141	261	233.00
RWR89S7150FS	01-118-8856	149	148.86
RWR89S75R0FS	01-161-3190	169	128.44
RWR89S8250FS	01-073-9128	266	223.47
RWR89S8450FS	01-068-9283	140	106.40
Total	78 <u>1/</u>	36142	31501.88

1/ Total number of NSNs

TABLE B.3

MIL-C-39003/1 Procurement Group 1 1/

DASH <u>2</u> / NO:	VOLTAGE	CAPACITANCE VALUE (uF)	NSN(5910-)	ADQ	ADV
2961	6	5.6	00-164-2031	214	151.94
2973	10	3.9	00-179-1095	495	460.35
2974	10	4.7	00-236-8740	6010	2404.00
2987	15	2.7	00-254-1605	712	299.04
2988	15	3.3	00-010-8159	11023	4519.43
2999	20	1.2	00-144-4379	1541	1186.57
3000	20	1.5	00-185-9045	2087	1126.98
3002	20	1.8	00-233-4029	357	539.07
3003	20	2.2	00-007-2002	10792	4208.88
Total	-	-	9 <u>3</u> /	33231	\$14896.26

1/ This procurement group is constrained by the following parameters:

Voltage: 6 to 35 Volts
 Capacitance tolerance: +10 percent
 Failure Rate: S
 Case: A

2/ Complete military part number consists of M39003/1-(Dash No.)3/ Total number of NSNs.

TABLE B.4

MIL-C-39003/1 Procurement Group 2 1/

DASH <u>2</u> / NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3034	.0047	00-182-7512	296	461.76
3036	.0056	00-516-9583	21	35.70
3937	.0068	00-189-6639	56	103.04
3040	.01	00-163-2189	3910	2580.60
3042	.012	00-262-0726	59	52.51
3043	.015	00-113-5685	91	46.41
3045	.018	00-513-0666	323	226.10
3046	.022	00-189-3579	303	224.22
3048	.027	00-434-2461	31	217.00
3049	.033	00-443-9102	274	153.44
3051	.039	00-337-9864	50	3950.00
3052	.047	00-189-6651	718	538.50
3054	.056	00-186-9285	144	162.72
3055	.068	00-254-8166	641	371.78
3057	.082	00-308-7103	76	120.84
3058	.1	00-189-3178	8232	4692.24
3060	.12	00-303-9784	290	348.00
3061	.15	00-270-2447	474	526.14
3063	.18	00-217-1228	48	25.44
3064	.22	00-187-0032	2398	1270.94
3066	.27	00-211-2493	1182	957.42
3069	.39	00-201-0962	454	671.92
3070	.47	00-185-9581	3672	1468.80
3072	.56	00-254-8166	641	371.78
3073	.68	00-254-8169	1268	887.60
3075	.82	00-409-5347	466	330.86
3076	1.0	00-495-0042	29329	10851.73
Total	-	27 <u>3</u> /	54806	\$31647.49

1/ This procurement group is constrained by the following parameters:

Voltage: 50 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: A

2/ Complete military part number consists of M39003/1-(Dash No.)3/ Total number of NSNs.

TABLE B.5

MIL-C-39003/1 Procurement Group 3 1/

DASH <u>2</u> / NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3102	.1	00-114-1072	966	772.80
3104	.12	00-010-8222	38	97.66
3105	.15	00-501-2087	26	82.42
3107	.18	01-019-9444	3	5.67
3108	.22	00-314-3852	613	1005.32
3110	.27	00-516-9534	19	32.49
3111	.33	00-140-0752	144	164.16
3114	.47	00-113-9526	328	380.48
3116	.56	00-443-9197	21	92.40
3117	.68	00-114-0218	180	336.60
Total	-	10 <u>3</u> /	2338	\$2970.00

1/ This procurement group is constrained by the following parameters:

Voltage: 75 Volts
 Capacitance tolerance: ±10%
 Failure Rate: S
 Case: A

2/ Complete military part number consists of M39003/1-(Dash No.)3/ Total number of NSNs.

TABLE B.6

MIL-C-39003/1 Procurement Group 4 1/

DASH <u>2</u> / NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3145	.0056	00-147-6731	24	82.56
3146	.0068	00-156-6357	22	40.92
3148	.0082	00-516-9554	21	173.88
3149	.01	00-236-8774	386	1713.84
3151	.012	01-067-0805	30	122.40
3152	.015	00-450-1423	27	147.69
3154	.018	00-564-4077	31	142.60
3155	.022	00-451-0964	159	979.44
3157	.027	00-362-0808	229	448.84
3158	.033	00-114-0380	87	232.29
3160	.039	00-544-5142	2	10.34
3161	.047	00-451-0966	288	763.20
3163	.056	01-035-7389	7	38.78
3164	.068	00-481-3128	91	280.28
3166	.082	00-443-9242	56	286.72
3167	.1	00-236-8777	975	1647.75
3169	.12	00-348-6910	54	140.40
3170	.15	00-114-0687	103	180.25
3172	.18	00-443-9196	25	77.00
3173	.22	00-236-8784	567	2494.80
3175	.27	00-113-9585	99	455.40
3176	.33	00-185-9067	69	130.41
3178	.39	00-560-2615	20	94.40
3179	.47	00-182-7510	1177	1777.27
3181	.56	00-203-4380	157	321.85
Total	-	25 <u>3</u> /	4706	\$12783.31

1/ This procurement group is constrained by the following parameters:

Voltage: 100 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: A

2/ Complete military part number consists of M39003/1-(Dash No.)

3. Total number of NSNs.

TABLE B.7

MIL-C-39003/1 Procurement Group 5 1/

DASH <u>2/</u> NO:	VOLTAGE	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
2964	6	47	00-010-8422	3903	2615.01
2966	6	56	00-007-2001	2494	1995.20
2976	10	27	00-007-3973	1198	2108.48
2977	10	33	00-189-4248	5655	4410.90
2979	10	39	00-192-7180	4602	3175.38
2990	15	18	00-238-6398	712	747.60
2991	15	22	00-007-3974	10168	7626.00
3005	20	8.2	00-481-0470	1498	1662.78
3006	20	10	00-113-5475	14262	10126.02
3008	20	12	00-007-3975	1883	1506.40
3009	20	15	00-007-2003	12303	8489.07
3023	35	5.6	00-761-7112	1743	2753.94
3024	35	6.8	00-144-4381	29519	16235.45
Total	-	-	13 <u>3/</u>	89940	\$63452.23

1/ This procurement group is constrained by the following parameters:

Voltage: 6 to 35 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: B

2/ Complete military part number consists of M39003/1-(Dash No.).3/ Total number of NSNs.

TABLE B.8

MIL-C-39003/1 Procurement Group 6 1/

DASH <u>2/</u> NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3078	1.2	00-270-2659	401	806.01
3079	1.5	00-113-9905	1165	1130.05
3081	1.8	00-284-6317	305	277.55
3082	2.2	00-420-8555	4669	3828.58
3084	2.7	00-270-3080	856	684.80
3085	3.3	00-211-1261	3390	2406.90
3087	3.9	00-209-1031	924	822.36
3088	4.7	00-007-2004	13729	10159.46
Total	-	8 <u>3/</u>	25439	\$20115.71

1/ This procurement group is constrained by the following parameters:

Voltage: 50 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: B

2/ Complete military part number consists of M39003/1-(Dash No.)3/ Total number of NSNs.

TABLE B.9

MIL-C-39003/1 Procurement Group 7

DASH <u>2</u> / NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3120	1.0	00-113-9628	269	946.88
3123	1.5	00-340-9673	79	146.94
3126	2.2	00-488-2651	237	692.04
3128	2.7	00-142-0128	32	75.84
3129	3.3	00-192-7191	888	1527.36
3131	3.9	00-010-8160	378	1209.60
Total	-	6 <u>3</u> /	1883	\$4598.66

1/ This procurement group is constrained by the following parameters:

Voltage: 75 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: B

2/ Complete military part number consists of M39003/1-(Dash No.)

3/ Total number of NSNs.

TABLE B.10

MIL-C-39003/1 Procurement Group 8

DASH <u>2/</u> NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3184	.82	00-506-4157	16	177.44
3185	1.0	00-270-3081	1297	1309.97
3187	1.2	01-016-7387	5	9.10
3188	1.5	00-513-0511	131	470.29
3190	1.8	00-333-0962	35	187.25
3191	2.2	00-180-3228	1255	3162.60
3193	2.7	00-114-1078	479	775.98
Total	-	7 <u>3/</u>	3218	\$6092.63

1/ This procurement group is constrained by the following parameters:

Voltage: 100 Volts
 Capacitance tolerance: ±10%
 Failure Rate: S
 Case: B

2/ Complete military part number consists of M39003/1-(Dash No.)

3/ Total number of NSNs.

TABLE B.11

MIL-C-39003/1 Procurement Group 9 1/

DASH <u>2/</u> NO:	VOLTAGE	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
2980	10	82	00-010-8233	74	378.88
2981	10	100	00-412-9235	2791	5582.00
2983	10	120	00-007-7471	1194	1993.98
2993	15	56	00-113-9906	756	2351.16
2994	15	68	00-156-7293	2667	5120.64
3011	20	27	00-114-0780	296	500.24
3012	20	33	00-010-8157	1655	3194.15
3014	20	39	00-402-9243	359	861.60
3015	20	47	00-113-5689	5751	11904.57
3026	35	22	00-144-4381	29519	16235.45
Total	-	-	10 <u>3/</u>	45062	\$48122.67

1/ This procurement group is constrained by the following parameters:

Voltage: 6 to 35 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: C

2/ Complete military part number consists of M39003/1-(Dash No.)3/ Total number of NSNs.

TABLE B.12

MIL-C-39003/1 Procurement Group 10

DASH <u>2/</u> NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3090	5.6	00-113-5679	191	773.55
3091	6.8	00-236-8773	948	3716.16
3093	8.2	00-147-4088	366	819.84
3094	10	00-236-8766	5798	9682.66
3096	12	00-189-2444	202	830.22
3097	15	00-010-8192	3860	9958.80
3099	18	00-160-5469	1075	4783.75
Total	-	7 <u>3/</u>	12440	\$30564.98

1/ This procurement group is constrained by the following parameters:

Voltage: 50 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: C

2/ Complete military part number consists of M39003/1-(Dash No.)

3/ Total number of NSNs.

TABLE B.13

MIL-C-39003/1 Procurement Group 11

DASH <u>2/</u> NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3132	4.7	00-010-8160	378	1209.60
3134	5.6	00-349-7083	106	942.34
3135	6.8	00-467-1521	4928	28434.56
3137	8.2	00-563-0056	70	553.00
3138	10	00-164-2978	1669	15037.69
Total	-	5 <u>3/</u>	7151	\$46177.19

1/ This procurement group is constrained by the following parameters:

Voltage: 75 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: C

2/ Complete military part number consists of M39003/1-(Dash No.)

3/ Total number of NSNs.

TABLE B.14

MIL-C-39003/1 Procurement Group 12

DASH <u>2/</u> NO:	VOLTAGE	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
2984	10	180	00-467-1318	171	495.90
2985	10	220	00-142-6950	2634	7375.20
2996	15	120	00-114-0787	739	2224.39
2997	15	150	00-018-1585	4181	10494.31
3017	20	56	00-142-6910	194	1583.04
3018	20	68	00-114-0221	1554	3900.54
3020	20	82	00-010-8437	1242	3763.26
3021	20	100	00-236-8745	7366	31379.16
3028	35	27	00-250-4852	426	1231.14
3029	35	33	00-164-2972	1522	7807.86
3031	35	39	00-114-0765	486	2707.02
3032	35	47	00-154-0547	11889	40779.27
Total	-	-	12 <u>3/</u>	32404	\$113741.09

1/ This procurement group is constrained by the following parameters:

Voltage: 6 to 35 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: D

2/ Complete military part number consists of M39003/1-(Dash No.)

3/ Total number of NSNs.

TABLE B.15

MIL-C-39003/1 Procurement Group 13 1/

DASH <u>2</u> / NO.	CAPACITANCE VALUE (uF)	NSN (5910-)	ADQ	ADV
3140	12	00-509-5843	28	402.64
3141	15	00-010-8184	994	3797.08
Total	-	2 <u>3</u>	1022	\$4199.72

1/ This procurement group is constrained by the following parameters:

Voltage: 75 Volts
 Capacitance tolerance: +10%
 Failure Rate: S
 Case: D

2/ Complete military part number consists of M39003/1-(Dash No.)3/ Total number of NSNs.

TABLE B.16

MIL-C-39014/1 Procurement Group 1 1/

DASH 2/ NO:	VOLTAGE (volts)	CAPACITANCE VALUE (pF)	NSN (5910-)	ADQ	ADV
1321	200	10	00-112-4337	8225	1974.00
1323	200	12	00-113-5492	1843	626.62
1324	200	15	00-010-8485	2562	563.64
1326	200	18	00-114-0082	1986	575.94
1327	200	22	00-114-0225	6184	1731.52
1329	200	27	00-114-0755	2467	641.42
1330	200	33	00-096-4644	4583	1099.92
1332	200	39	01-004-2465	2540	685.80
1333	200	47	00-113-5515	6655	1464.10
1335	200	56	00-113-5470	2934	850.86
1336	200	68	00-113-5471	6414	2180.76
1338	200	82	00-114-0802	4000	1360.00
1339	200	100	00-113-5445	18891	4344.93
1341	200	120	00-164-2069	3456	829.44
1342	200	150	00-113-5328	5435	1576.15
1344	200	180	00-114-0683	2762	690.50
1345	200	220	00-010-8498	8923	2141.52
1347	200	270	00-010-8534	4860	1069.20
1348	200	330	00-156-5999	4683	1077.09
1350	200	390	00-113-5467	3729	820.38
1351	200	470	00-113-5276	12981	3375.06
1353	200	560	00-199-5335	5066	1367.82
1354	200	680	00-113-7448	5904	1653.12
1356	200	820	00-124-0618	3547	1205.98
1357	200	1000	00-010-8666	36400	7100.00
1359	100	1200	00-096-5160	1808	614.72
1360	100	1500	00-121-7379	2101	630.30
1562	100	1800	00-098-9234	1625	552.50
1563	100	2200	00-113-5277	22085	4858.70
1565	100	2700	00-098-9237	1305	391.50
1566	100	3300	00-098-9242	1846	553.80

TABLE B.16

MIL-C-39014/1 Procurement Group 1 (continued)

1568	100	3900	00-166-6757	1269	431.46
1569	100	4700	00-010-8715	6802	2040.60
1571	100	5600	00-124-0627	4825	1447.50
1572	100	6800	00-107-7418	1905	552.45
1574	100	8200	00-098-9248	1240	359.60
1575	100	10000	00-124-0659	71587	12885.66
1577	50	12000	00-284-8295	729	247.86
1578	50	15000	00-098-8670	4524	1131.00
1580	50	18000	00-254-2410	1290	438.60
1581	50	22000	00-114-0510	3582	931.32
1583	50	27000	00-305-9515	1244	360.76
1584	50	33000	00-262-5713	1827	621.18
1586	50	39000	00-114-0113	767	253.11
1587	50	47000	00-113-5278	7993	2477.83
1589	50	56000	00-113-5730	1411	451.52
1590	50	68000	00-132-5968	2831	764.37
1592	50	82000	00-113-5283	375	153.75
1593	50	100000	00-010-8717	98240	20630.40
Total	-	-	49 <u>3/</u>	410241	\$96786.22

1/ This procurement group is based on a +10 percent capacitance tolerance and failure rate S.

2/ Complete part number consists of M39014/1-(Dash No.)

3/ Total number of NSNs.

TABLE B.17

MIL-C-39014/2 Procurement Group 2 1/

DASH <u>2</u> / NO:	VOLTAGE (volts)	CAPACITANCE VALUE (pF)	NSN (5910-)	ADQ	ADV
1321	200	1200	00-107-4241	1059	264.75
1322	200	1500	00-113-5312	1798	539.40
1324	200	1800	00-113-9446	717	236.61
1326	200	2200	00-101-2381	22081	4637.01
1328	200	2700	00-127-2407	1100	275.00
1329	200	3300	00-101-2382	2795	698.75
1331	200	3900	00-114-0781	973	321.09
1332	200	4700	00-143-0501	11133	2560.59
1334	200	5600	00-171-0015	615	159.90
1335	200	6800	00-113-9716	2004	541.08
1337	200	8200	00-113-9445	1937	639.21
1338	200	10000	00-010-8718	41638	8743.98
1353	50	120000	00-114-0856	1176	517.44
1354	50	150000	00-098-9277	2292	825.12
1355	50	180000	00-113-5536	1176	470.40
1356	50	220000	00-113-5286	11341	4649.81
1357	50	270000	00-158-4785	1294	685.82
1358	50	330000	00-113-5284	5492	2910.76
1359	50	390000	00-113-5459	801	696.87
1360	50	470000	00-113-5465	11024	6945.12
1416	50	560000	00-179-0383	1282	1153.80
1417	50	680000	00-113-9453	4809	5289.90
1418	50	820000	00-233-2760	1314	1156.32
1419	50	1000000	00-010-8721	57987	49288.95
Total	-	-	35 <u>3</u> /	315101	\$120510.41

1/ This procurement group is based on a +10 percent capacitance tolerance and failure rate S.

2/ Complete part number consists of M39014/2-(Dash No.)

3/ Total number of NSNs.

TABLE B.18

MIL-C-39019 Procurement Group 1

<u>DASH NUMBER</u>	<u>NSN (5925-)</u>	<u>ADQ</u>	<u>ADV</u>
	MIL-C-39019/1		
200	00-890-9408	39	704.73
203	01-090-5877	3	84.00
206	01-061-6491	26	646.10
207	01-096-5269	14	348.04
208	01-096-4690	9	202.68
209	01-038-1349	109	2517.90
210	01-037-6894	52	1456.00
212	01-092-2467	36	779.76
213	01-046-7447	19	532.00
215	01-040-7242	210	5829.60
216	01-047-7510	1217	30242.45
217	01-099-0369	4	99.40
218	01-031-4861	886	19952.72
219	01-024-4153	813	19715.25
220	01-042-1235	77	1913.45
221	01-090-5256	3	74.55
222	01-096-7604	55	1238.60
224	01-036-6628	237	6636.00
225	01-037-0466	243	7170.93
226	01-099-0370	39	864.63
227	01-041-3866	1209	33005.70
228	01-047-2140	68	1689.80
229	01-109-8823	19	741.95
230	01-041-9943	531	14740.56
231	01-038-1352	599	14567.68
232	01-091-7219	17	476.00
233	01-026-8525	2	50.32
234	01-019-9703	179	4969.04
236	01-073-0851	4	123.60
237	01-058-1131	33	743.16
238	01-091-1253	1	20.42
239	01-096-4673	12	359.04
240	01-086-1441	1	23.10

TABLE B.18

MIL-C-39019 Procurement Group 1 (continued)

242	01-048-5323	10	197.70
243	01-038-1344	220	6351.40
244	01-092-4243	29	592.18
245	01-034-9181	6	100.98
248	01-037-3324	166	3738.32
249	01-037-6887	544	13518.40
250	01-091-7214	37	1455.95
251	01-038-1350	26	692.90
252	01-044-0308	104	3213.60
254	01-047-1458	65	1820.00
255	01-040-7156	342	9873.54
257	01-044-5507	562	15736.00
258	01-039-4098	270	6709.50
305	01-135-1195	1	41.44
309	01-135-1194	1	41.44
313	01-111-1312	1	39.11
316	01-128-4374	1	24.45
317	01-135-4894	1	41.44
319	01-111-1313	9	372.96
321	01-111-1308	7	273.84
329	01-119-4387	22	760.10
331	01-135-1193	1	41.44

MIL-C-39019/2

200	01-060-2342	78	2728.44
202	01-092-2468	3	90.24
209	01-036-7398	1705	46035.00
210	01-037-6891	37	1358.64
213	01-096-4659	7	210.56
215	01-037-6882	7	186.48
216	01-041-2586	130	3910.40
217	01-091-7218	8	240.64
218	01-135-6136	21	554.61
219	01-038-5764	221	7474.22
220	01-066-3758	3	90.24

TABLE B.18

MIL-C-39019 Procurement Group 1 (continued)

224	01-051-3119	7	196.84
225	01-048-5324	19	412.68
226	01-104-3443	13	365.56
227	01-096-4688	1	32.41
228	01-065-3934	37	1112.96
230	01-038-3944	43	1293.44
231	01-037-6897	31	877.30
232	01-104-0422	7	204.26
234	01-041-3930	212	5724.00
237	01-070-7436	46	1673.02
240	01-120-9105	4	120.32
243	01-073-8954	15	399.60
248	01-041-2580	6	176.88
249	01-048-7093	139	4862.22
250	01-045-6622	1	26.41
251	01-119-1102	1	30.08
252	01-138-3292	10	324.10
254	01-069-5620	56	1814.96
255	01-089-9443	53	1532.76
258	00-252-4209	104	3517.28
310	01-157-9545	2	394.20
312	01-158-4402	2	453.84
314	01-157-9547	2	458.00
318	01-157-4608	14	2023.36
320	01-157-9546	2	504.72
322	01-157-4609	2	387.00
329	01-157-4610	2	404.82
334	01-157-7803	2	404.82
TOTAL	94 ^{1/}	12244	\$330763.18

^{1/} Total Number of NSNs

TABLE B.19

MIL-C-39019 Procurement Group 2

<u>DASH NUMBER</u>	<u>NSN (5925-)</u>	<u>ADQ</u>	<u>ADV</u>
	MIL-C-39019/3		
200	01-047-1469	1	63.67
206	01-134-8031	4	169.48
209	01-037-6881	118	4999.66
210	01-037-8753	43	2352.53
215	01-068-2435	103	4705.04
216	01-047-4688	59	2331.09
217	01-039-3073	2	84.74
218	01-073-8951	39	1652.43
219	01-041-2585	138	7285.02
221	01-052-5128	1	58.20
222	01-042-1234	1	66.29
224	01-048-7087	105	4796.40
228	01-073-0849	11	729.19
230	01-028-1717	102	4321.74
231	01-042-2543	301	14469.07
233	01-047-7509	9	492.39
234	01-046-0375	6	274.08
236	01-075-3809	2	138.98
240	01-120-8756	5	334.40
242	01-037-6878	1	31.91
248	01-037-5866	52	2203.24
249	01-018-6843	84	3559.08
250	01-091-8964	20	1137.20
251	01-085-6441	8	535.04
252	01-603-7002	4	158.04
254	01-020-1748	98	5361.58
255	01-034-9175	144	6922.08
257	01-045-7173	180	7626.60
258	01-039-3763	166	8047.68
259	01-092-2482	10	456.80
321	01-123-5152	15	861.60
339	01-123-5153	1	57.44

TABLE B.19

MIL-C-39019 Procurement Group 2 (continued)

MIL-C-39019/4			
212	01-127-3794	10	732.10
215	00-497-8876	40	2346.80
216	01-030-2973	38	1855.54
218	01-075-3807	4	272.72
219	01-042-8668	41	2491.16
224	01-030-5088	4	206.24
225	01-038-1347	36	1841.76
228	01-027-8130	1	70.88
230	01-122-5020	19	1928.50
231	01-030-2974	28	1367.24
233	01-079-6990	10	480.20
234	01-038-1355	17	830.11
242	01-057-5697	3	168.45
243	01-059-0275	8	409.28
248	01-075-3808	7	500.29
249	01-051-3120	34	1660.22
252	01-094-9652	16	1134.08
255	01-058-7494	13	716.95
258	01-046-6904	4	269.56
259	01-096-4702	1	71.47
317	01-152-6988	4	384.12
333	01-128-4371	24	1479.12
MIL-C-39019/5			
200	01-019-5138	5	269.55
207	01-096-4679	100	4404.00
209	01-043-2334	17	907.63
210	01-045-7172	78	4988.88
214	01-096-4684	1	63.96
215	01-421-2802	134	7236.00
218	01-037-6875	90	5756.40
219	01-044-0307	200	13200.00

TABLE B.19

MIL-C-39019 Procurement Group 2 (continued)

221	01-106-4498	4	403.96
222	01-112-0659	25	1504.75
224	01-025-7008	545	33588.35
225	01-033-0457	293	17292.86
226	01-120-1121	6	561.90
227	01-025-7007	18	1109.34
228	01-096-4699	57	3645.72
230	00-871-6476	154	9692.76
231	01-043-2333	156	9614.28
233	01-097-2540	1	133.22
234	01-045-0618	44	2814.24
236	01-071-6628	14	1071.56
237	01-060-9523	18	1325.16
239	01-096-4665	26	1602.38
240	01-096-8606	6	383.76
242	01-068-9364	3	219.12
243	01-040-8957	117	7210.71
246	01-050-4108	3	122.04
249	01-044-0309	407	27570.18
251	01-042-2542	13	801.19
252	01-039-3764	4	196.32
254	01-038-4066	49	2646.00
255	01-044-0276	169	10809.24
256	01-096-4685	10	918.40
257	01-041-2584	89	5692.44
258	01-040-6141	264	18223.92
321	01-111-1309	4	284.72
339	01-111-0155	4	1206.56

MIL-C-39019/6

209	01-084-8930	9	595.08
210	01-038-7912	36	2233.80
214	01-085-6443	5	310.25
216	01-037-6885	67	5104.73
218	01-075-2727	3	198.36

TABLE B.19

MIL-C-39019 Procurement Group 2 (continued)

219	01-038-1332	69	4723.05
222	01-120-9106	3	295.35
224	01-051-2283	3	207.54
225	01-018-5651	76	5025.12
228	01-019-5134	67	4430.04
230	01-044-0306	17	1163.65
231	01-036-6026	96	6347.52
233	01-070-9483	31	2049.72
234	01-038-1357	40	3226.40
236	01-069-5002	7	362.88
237	01-042-8662	38	2601.10
240	01-070-6605	3	205.35
242	01-094-9653	3	301.35
243	01-019-5135	13	859.56
245	01-037-6876	14	702.38
248	01-051-7878	7	499.73
249	01-036-6027	96	7481.28
254	01-036-8617	51	3490.95
255	01-019-8466	39	2669.55
257	01-041-2579	31	2455.51
258	01-038-1346	20	1613.20
312	01-157-9544	2	732.56
326	01-159-5236	2	624.56
TOTAL	78 <u>1/</u>	6173	\$366156.39

1/ Total Number of NSNs

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The Defense Electronic Supply Center (DESC) purchases each one of the items it manages as the individual item breaches its reorder point. The objective of this thesis effort was to determine if it would be feasible for DESC to use a procurement group buying concept to purchase some of the items it manages. This concept would consist of buying items with similar characteristics as groups, rather than individually. Five groups of items were selected for review; these items were groups of similar items covered by military specifications MIL-C-39003, MIL-R-39007, MIL-R-39008, MIL-C-39014, and MIL-C-39019. The groups were reviewed and profiles of each group developed. The profiles, along with a letter and questionnaire, were furnished to the manufacturers that had qualified products for each of the military specifications. Interviews were then conducted with the manufacturers and with DESC managers in the Directorates of Supply Operations and Contracting and Production. The conclusions reached were that the procurement group buying concept was feasible but only under certain conditions. First, at least one of the manufacturers must be interested in the concept and willing to give quantity discounts on the group. Second, the annual dollar demand of the group must be sufficient to permit enough savings to offset any additional administrative costs resulting from group buying. As a result of this thesis effort, several recommendations were made: (1) conduct a pilot test of the group buying concept using the MIL-C-39019 groups, (2) investigate the possibility of annual procurements for the MIL-R-39007 and MIL-C-39014 groups, (3) conduct further investigation on the MIL-R-39008 group with the idea of distributor involvement and, (4) review other military specifications for possible application of a group buying concept.

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